

**TWENTY-SEVENTH
ANNUAL REPORT**

of the

**INDIAN
CENTRAL COTTON COMMITTEE**

for the year ended

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1948.

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INDIAN CENTRAL COTTON COMMITTEE ANNUAL REPORT.

CHAPTER I.

GENERAL.

THE Indian Central Cotton Committee was established by the Government of India in 1921, in pursuance of the recommendations of the Indian Cotton Committee of 1917-18, and this is its twenty-seventh Annual Report covering the period 1st September, 1947, to 31st August, 1948. At first, the Committee was purely a technical advisory body to Government on matters connected with cotton. In 1923, however, it was incorporated under the Indian Cotton Cess Act and provided with separate funds to enable it to undertake work for the improvement of the growing, marketing and manufacture of Indian cotton. These funds are derived from the levy of a cess on all cottons consumed in mills in India or exported from Indian ports. For the first three years after the passing of the Act, the cess was collected at the rate of annas four on every bale of Indian cotton consumed in Indian mills or exported and, thereafter, at the rate of annas two. Subsequently, as a result of the war and the consequent decline in exports, receipts from the cess dropped considerably and it became necessary for the Committee to fall back on its accumulated funds in order to finance its activities. The income of the Committee was further reduced by the partition of the country on 15th August, 1947. Due to the constitution of Pakistan as an independent country, the cess on exports of cotton from Pakistan as also on cotton consumed in Pakistan mills was lost to the Committee. This loss of income was made up to some extent by grants given by the Government of India from the Cotton Fund built up from the proceeds of the levy of an additional duty of one anna per lb. on all imports of raw cotton. However, it was felt essential that the Committee should be assured of a more regular income to enable it to carry out its future work and policy effectively. Accordingly by two successive amendments (Appendix I) of the Indian Cotton Cess Act in 1947 and 1948, the cess was made leviable on all cotton consumed in Indian mills or exported from India with effect from 15th August, 1947, and the rate of the cess was raised from two annas per bale to four annas per bale

from 10th September, 1948. The idea from the very beginning was that the Indian Central Cotton Committee should form a common meeting ground for all sections of the cotton industry with the Agricultural Departments of all the cotton growing provinces in India, at which the cotton problems of the country would be discussed and measures suggested for tackling them. It was realised from the outset that the cultivator's interests must be paramount in all matters considered and decided on by the Committee and that no permanent developments could take place unless they were in his interests.

The first task of the Committee was to arrange for a well-directed co-ordinated effort for the improvement of every aspect of cotton in India, including the improvement of the race of the plant by scientific plant breeding. Grants were made to Departments of Agriculture in the various cotton growing Provinces and States for specific investigations on cotton, in which improvement of the variety was naturally given high priority. The policy in the main has been to supplement and not to supplant the work of the Provincial and State Departments of Agriculture, and though, as a matter of convenience, certain lines of demarcation have been laid down regarding the investigations which the Committee considers most appropriate for its grants, assistance, as a general rule, is given in the directions where it is most needed.

Under the Indian Cotton Cess Rules, members who are not *ex-officio* members, hold office for three years and one-third of their number retire each year in rotation. The term of office of additional members appointed by the Governor-General under Section 4 (x) of the Indian Cotton Cess Act is three years or such lesser period as may be specified in the notification appointing them. A list of members constituting the Committee indicating the various interests they represent, as on the 31st August, 1948, is given in Appendix II. The composition of the various Sub-Committees of the Committee as on the 31st August, 1948, is shown in Appendix III. The functions of these Sub-Committees have been detailed in earlier reports of the Committee.

Mr. C. J. Bocarro, Assistant Secretary of the Committee, continued to officiate as Secretary of the Committee upto the 17th August, 1948, when Shri Kalidas Sawhney, Director of Agriculture, Hyderabad State, who was appointed as Secretary of the Committee assumed charge of the office. Shri Ajodhya Sahai, Superintendent of the office, officiated as Assistant Secretary, up to the 17th August, 1948.

Shri D. L. Sen, officiating Director of the Technological Laboratory, was confirmed in that appointment retrospectively from the 17th February, 1947.

The total receipts of the Committee up to the 31st March, 1948, since its inception amounted to Rs. 2,32,09,668-4-1 of which Rs. 1,73,83,701-6-3 represent collections from the Cotton Cess and the remainder, miscellaneous receipts and special grants from the Government of India. The receipts during the year amounted to Rs. 6,30,718-12-2 and the total expenditure to Rs. 9,92,895-4-7. A statement of receipts and expenditure as well as the Balance Sheet for the year as at 31st March, 1948, is contained in Appendix IV.

Sardar Datar Singh (President), Shri R. G. Saraiya, (Vice-President), Shri Chunilal B. Mehta, Shri Madhaorao Deshpande, Shri Kalidas Sawhney, Shri V. Isvaran and the Secretary represented the Committee on the Board of Governors of the Institute of Plant Industry, Indore, during the financial year ending 31st March, 1948. During the same period, Sir Roger Thomas represented the Committee on the Indian Council of Agricultural Research. Under Article 51 of the Articles of Association of the East India Cotton Association, the Indian Central Cotton Committee is entitled to nominate from amongst its growers' representatives three persons, whether members of the Association or not, not having dealings in forward contracts, as Directors of the Association. Shri Madhaorao Deshpande, Shri F. B. Loxmeshwar and Raje J. R. Deshmukh were elected as the Committee's representatives on the Board of Directors of the Association for the cotton year 1947-48. On the termination of the appointment of Shri Madhaorao Deshpande as a member of the Committee his place on the Board of Directors of the East India Cotton Association was filled by Shri S. K. Wankhede.

Two meetings of the Indian Central Cotton Committee were held in the year under report at both of which Sardar Datar Singh, President of the Committee and Vice-Chairman of the Indian Council of Agricultural Research, presided. The first meeting was held at Bombay on the 21st and 22nd November, 1947. The most important subject considered at this meeting was the position, consequent on the partition of the country of the supply of cotton of the types required by mills in the Indian Dominion and the future policy to be followed in this connection. The subject was first examined by a special Sub-Committee which expressed the view that under the changed

conditions, it had become absolutely imperative that there should be a complete re-orientation of the cotton policy of the Committee and in pursuance of this view it suggested that in future the Committee should assume full responsibility for all cotton work which should be put on a sound and permanent basis. The only way of achieving this objective was, in its opinion, by the establishment of permanent cotton research stations in all the main cotton tracts of the country. The functions of these stations would be to carry out a survey of the areas for which they would be responsible, to see that only the most suitable cottons are produced in those tracts and to ensure a proper supply of pure seed. In addition to the main stations, it was suggested that there should be subsidiary stations as might be found necessary.

The Committee passed the following resolution on this subject :—

RESOLUTION :—

“ In view of the very satisfactory results obtained from the research work done by the Committee in the past, the Indian Central Cotton Committee feels that it is imperative now that further impetus should be given to such work. It is unanimously of the opinion that the research work done at present on Indian cotton is totally inadequate and strongly recommends to the Government of India that they give urgent consideration to the scheme put forward by the Indian Central Cotton Committee for the development of research work throughout the Dominion of India.”

The question of surveys and appeals under the bye-laws of the East India Cotton Association was another subject which received the earnest consideration of the Committee at this meeting. In this connection the Committee recommended in replacement of the then existing system the appointment of paid surveyors of proved honesty and integrity not personally interested in the trade.

At the same meeting the Committee also passed a resolution recommending the free export of cotton to all permissible destinations up to the 31st March, 1948, and also the removal of the ceiling prices on cotton.

The second meeting was held in March, 1948. The most important subject that came up for discussion was the planned production of cotton for the year 1948-49 season. So a result of the partition of the country, the need for increasing the area under staple cotton in the Dominion of India had become imperative. On the basis of the figures for the year 1946-47, the annual consumption of cotton in mills in the Indian Dominion was estimated at 38.6 lakhs bales comprising Indian, Pakistan and other foreign cotton and extra-factory consumption at 2.7 lakhs bales

thus making a total of 41.3 lakhs bales. Against this figure, production in the Dominion of India was estimated at 26 lakhs bales only. Whilst this replacement of foreign (other than Pakistan) cotton by indigeneous cotton was not considered likely in the near future, it was felt that the present production of cotton would have to be raised by one third to attain the limited objective of making India independent of supplies of Pakistan cotton. The yield of cotton could be raised to some extent on the existing acreage by the greater use of manure and the extension of irrigation facilities, but in view of the overriding necessity of producing more food in the country, the application of these aids would for sometime at least be limited. The only alternative left, therefore, for increasing the production of cotton was the extension of the acreage under cotton. The Committee accordingly recommended an increase of 4 million acres under medium and long staple varieties in the various Provinces and States thus raising the annual cotton area of the country from 11 million to about 15 million acres. It also strongly urged that the Central Government should recommend to all Provincial Governments to see that all possible measures are adopted to increase the acre yield of cotton and to incur such expenditure as may be necessary for the purpose of well sinking projects and the supply of manures and fertilizers at subsidised rates.

CHAPTER II.

PARTITION AND THE COTTON PROBLEM IN INDIA

As this is the first report after the partition of the country on the 15th August, 1947, it would be appropriate here to describe briefly the effects of the partition on the cotton supply position. The total area under cotton in undivided India during 1946-47 was 15,038,000 acres, of which the tracts now constituting the Indian Union (including Hyderabad State) and Pakistan accounted for 11,671,000 and 3,367,000 acres, respectively. The total area under irrigated cotton in undivided India during that year was about 4,100,000 acres, of which Pakistan accounted for 3.3 million acres. In other words, as a result of the partition, slightly less than one fourth of the total area and over four fifths of the area under irrigated cotton in undivided India, have fallen to the share of Pakistan. On the basis of the cotton area in undivided India in the pre-war year 1938-39, however, Pakistan's share then amounted to 15% of the total cotton acreage and nearly two-thirds of the area under irrigated cotton. The relatively higher share of Pakistan in the acreage for 1946-47 is due almost wholly to the fact that whereas the Indian Dominion curtailed a great deal of its cotton area (particularly of short staple varieties) during the war, the Pakistan Provinces effected very little reduction.

The effect of partition on the cotton supply position in India is illustrated by the following table showing the production of cotton during 1946-47 in undivided India, Indian Union and Pakistan. The figures are based on the estimates of actual production arrived at from 'cotton pressed' and 'unpressed cotton consumed in mills':—

Staple lengths.					In lakhs of bales.		
					Undivided India.	Indian Union.	Pakistan.
7/8" and above	{	Actual .. ..	.. ..	.. ..	9.9	4.5	5.4
		Per cent .. ..	.. ..	.. ..	23	17	34
Below 7/8" and above 11/16"	{	Actual .. ..	.. ..	.. ..	20.9	13.0	7.9
		Per cent .. ..	.. ..	.. ..	50	50	49
11/16" and below	{	Actual .. ..	.. ..	.. ..	11.2	8.5	2.7
		Per cent .. ..	.. ..	.. ..	27	33	17
Total all staples	{	Actual .. ..	.. ..	.. ..	42.0	26.0	16.0
		Per cent .. ..	.. ..	.. ..	100	100	100

The data given above show that the Indian Union's share of undivided India's production of cotton of staple lengths '7/8" and above,' 'below 7/8" and above 11/16" ' and '11/16" and below,' formed 45, 62 and 76 per cent, respectively. As regards cotton of staple length 1" and above, it may be mentioned that the Indian Union's and Pakistan's production amounted to 1 and 2 lakhs bales, respectively.

While the Indian Union's share of the total crop of 42 lakhs bales of undivided India in 1946-47 was only 26.0 lakhs bales (62%), its mill consumption accounted for 38.6 lakhs bales (98% of the total mill consumption of undivided India amounting to 39.4 lakhs bales.) Details of the Indian Union's mill consumption of cotton classified by staple length are given below :—

Mill consumption of cotton in Indian Union in 1946-47.

(In lakhs of bales.)

Staple lengths.	Indian Union cotton.	Pakistan cotton.	Other foreign cotton.	Total all cotton.
7/8" and above	3.9	4.2	7.0	15.1
Below 7/8" and above 11/16"	12.5	5.6	..	18.1
11/16" and below	5.4	..	..	5.4
Total (all staples) ..	21.8	9.8	7.0	38.6

It will be observed from the figures given above that, at the level of consumption in 1946-47, the Indian Union was dependent on Pakistan cotton to the extent of 9.8 lakhs bales (4.2 lakhs bales of staple length 7/8" and above and 5.6 lakhs bales of staple length below 7/8" and above 11/16") and other foreign cotton to the extent of 7.0 lakhs bales (mostly 1" and above in staple).

The position regarding production and consumption of cotton in the Indian Union in 1947-48 was as under :—

In lakhs of bales.

	Long staple (7/8" and above.)	Medium staple (below 7/8" and above 11/16".)	Short staple (11/16" and below.)	Total.
Production in Indian Union	5.0	16.6	10.3	31.9
Mill consumption :—				
Indian Union cotton	5.0	18.4	5.7	29.1
Pakistan cotton	4.4	2.4	..	6.8
Other foreign cotton	6.2	..	..	6.2
	15.6	20.8	5.7	42.1
Extra-factory consumption .. .. .	..	0.4	2.3	2.7
Total (internal requirements)	15.6	21.2	8.0	44.8

It will be seen that as against the total production of 31.9 lakhs bales in 1947-48 (on an acreage of about 11 millions) the internal requirements (including extra-factory consumption) amounted to 44.8 lakhs bales, leaving a deficit of 12.9 lakhs bales. Out of the production, about 2.3 lakhs bales of short staple cotton were surplus to internal requirements and were exported. If allowance is made on this account, the real deficit is of the order of 15.2 lakhs bales. This deficit was met in 1947-48 by the use of 6.8 lakhs bales of Pakistan cotton (4.4 lakhs bales of long staple and 2.4 lakhs bales of medium staple), 2.2 lakhs bales of medium staple Indian Union cotton from the previous carryover which would otherwise have been imported from Pakistan and 6.2 lakhs bales of other foreign cotton of long staple.

As far as can be foreseen at present, the types of cotton imported from countries other than Pakistan are not likely to be grown in the country for some time to come. The import of 6 to 7 lakhs bales of these varieties will, therefore, have to be continued until as a result of research and experimental work now initiated in the Madras Province and Mysore State, suitable varieties of equally good cotton have been developed for cultivation in India. The dependence on Pakistan, however, can largely be avoided, as barring a very small quantity, Pakistan cotton can be replaced by increasing the production of similar varieties already in cultivation in the Indian Dominion.

In order to become independent of Pakistan, provision has to be made for an additional annual production of 4.4 lakhs bales of long staple and 4.6 lakhs bales of medium staple cotton. To achieve this object, the Indian Central Cotton Committee in March 1948 recommended to the Government of India, an over-all increase of 4.0 million acres in the area under medium and long staple cotton (as compared with the area in 1946-47, viz., 11.7 million acres) distributed according to different varieties as under :—

Name of variety.	Staple length.	Proposed increase over 1946-47 (in lakhs of acres.)	Estimated increase in production (in lakhs of bales.)
Cambodias Co.2, Co.3 and Co.4	1" and above ..	1.0	0.40
Surti-Suyog	7/8" to 31/32 " ..	3.0	0.68
Cambodias		1.5	0.75
Kumpta Jayawant		7.0	1.10
Buri (including Cambodia)		2.5	0.46
Hyderabad Gaorani	13/16" to 27/32".	4.0	0.63
Hyderabad American		0.5	0.08
Broach Vijaya		3.0	0.58
Westerns and Northern	13/16" to 27/32".	2.0	0.27
Karunganni		0.5	0.12
Jarila, Verum or H.420		12.0	2.53
Dholleras	Below 13/16" and above 11/16".	3.0	0.50
	Total ..	40.0	8.10

No final decision has so far been taken by the Government of India on the above recommendation. The effect that such increase in cotton acreage might have on the position of food crops is still under examination.

C. P. I and C. P. II), Mathia and Comillas and the doubling of the export duty on cotton from Rs. 20 to Rs. 40 per bale, the market reacted sharply on the 20th January. The nervous feeling was, however, short-lived. The news that the Pakistan Government had also decided to double the export duty on raw cotton and also to restrict the exports of cotton to foreign countries including the Indian Union, took the price of the March contract to Rs. 541-8 on the 24th January. The price level, however, began to slip down gradually due to various factors including reports regarding negotiations between India and Pakistan for cotton supplies against cloth. On the 31st January, the market remained closed on account of the tragic death of Mahatma Gandhi, the Father of the Nation.

During the month of February, the market ruled very firm due to the strong statistical position of Indian cotton, the rapid advance of Egyptian cotton prices, the paucity of arrivals from up-country and the scarcity of desirable varieties. The Pakistan Government's announcement on the 22nd February regarding the removal of floor and ceiling prices fixed for Pakistan cotton and the further enhancement of the export duty from Rs. 40 to Rs. 60 per bale had a bullish effect on the Bombay cotton market. After a voluntary suspension of business for nearly 13 days as a protest against the levy of stamp duty on all futures cotton transactions, the Bombay cotton market re-opened on the 10th March when the Indian Cotton Contract, March delivery, was quoted at Rs. 581. The announcement of the Indo-Pakistan agreement for exchange of Indian cloth against Pakistan cotton on the basis of 12 bales of cloth for every 20 bales of Pakistan cotton up to the 31st August, 1948, was interpreted bearishly in the first instance. The trade soon realised that Pakistan cotton would have to bear the export duty of Rs. 60 per bale and the Indian import duty, while Pakistan had no large quantities of desirable varieties to offer to India. The delay in the arrivals of cotton from up-country, better advices from the ready market coupled with the failure of the Indo-Sudanese talks for the purchase of Sudan cotton, all contributed to push up prices. This position continued up to the middle of March. Thereafter the Finance Minister's statement about the Central Government's proposed legislation to curb speculation brought about a sharp reaction in prices on the 18th March. Again, except for occasional setbacks the upward trend was resumed owing to the rising prices of Egyptians and the growing feeling that Pakistan would not be able to meet her commitments to India. The March contract eventually matured at Rs. 612. At the end of March,

the May contract closed around Rs. 623. The average price during March for the nearest delivery month was Rs. 593.

In April, the market remained very firm and prices touched a record high level in the existence of the Indian Cotton Contract. On the 3rd April, the Government of India announced the continuance of the restrictions on export. By the 9th April, there was an all-round spurt in prices, owing to the encouraging announcement of the Government of India's industrial policy, the higher cotton consumption by mills, the Government's intention to lift the existing control of cloth and yarn and the uncertainty of cotton imports from abroad. The bullish fervour was, however, checked on reports of a requisition made to the East India Cotton Association demanding the declaration of a "squeeze" and the reported exemption from the import duty granted by the Government of India to Pakistan cotton. Prices moved for sometime in a seesaw manner. After the result of the poll at the General Meeting of the East India Cotton Association declaring the existence of a squeeze, the market again firmed up on reports that a further representation would be made to nullify the declared emergency and of the total decontrol of cloth. The May contract rose to Rs. 726 on the 23rd April. With the gradual shifting of interest from May to July position, the price of the May contract declined to Rs. 698 on the 30th April. After erratic fluctuations, the market took an upward course again from the 10th May, following the resolution passed by the East India Cotton Association declaring the state of emergency to be at an end. The prospects of exports of cotton to Japan, consequent on the arrival of the SCAP Trade Mission in India, added to the bullish fervour. The result was that May and July contracts spurted up to the peak levels of Rs. 770 and Rs. 789, respectively, on the 13th May. Prices thereafter declined notwithstanding bullish factors such as the announcement of the Government of India to allow, as a special case, the exports to Japan of 55,000 bales of raw cotton, including the prohibited varieties C.P.1 and C.P.2 and Jarila and the active spot demand for desirable growths. Reports about the decline in Egyptian cotton prices and the possibility of drastic Government measures to bring down the prices of cloth encouraged the sagging tendency, with occasional rallies. The reported purchases of sizable quantities of cotton by the SCAP Trade Mission imparted firmness to the price level. Subsequently, however, the news about the conclusion

of an agreement between the Pakistan and Indian Dominions in respect of essential commodities including cotton and cloth and rumours about the impending imposition of textile control, depressed sentiment with the result that the July contract slipped to Rs. 714 on the 31st May.

The dominant factors which influenced cotton prices in June, apart from expectations of a larger crop during 1948-49, were the prospects of imports of foreign cotton from Egypt, Brazil and the U.S.A., as well as of imports of 650,000 bales from Pakistan according to the Indo-Pakistan Trade Agreement. The highest and lowest prices of the July contract during June were Rs. 732 and Rs. 643, respectively. The delayed monsoon in several cotton growing tracts, encouraging mill consumption, the reported failure of the Indian cotton delegation's mission to Egypt and the Indo-Hyderabad developments were the main factors which contributed to firm prices early in July. Thereafter press reports of a likely re-imposition of cloth control combined with switching over of commitments from July to September contract, depressed the quotation for July delivery. This was followed by an upward trend in prices until July delivery matured at Rs. 680 on the 25th July. After a short spell of erratic fluctuations, the Government of India's announcement regarding the imposition of textile control, the freezing of mill stocks of cloth and the proposal to control cotton prices unnerved the market and prices precipitately slumped and closed at Rs. 593 on the 31st July. During the month of August, the market ruled easy in the beginning and slumped on Government's announcement of the floor and ceiling prices for Jarila basic cotton tenderable against the Indian Cotton Contract. The floor price of Jarila (Fine) cotton 25/32" staple was fixed at Rs. 495 and the ceiling price at Rs. 620 per candy of 784 lbs. net which corresponded to a ceiling price of Rs. 600 for Jarila (Fine) 3/4" staple. The uncertainty as to whether the current crop was covered by the control order and reports of a bumper crop in the U.S.A., resulted in lack of confidence in prices. In the meantime, the Government of India announced that imports of raw cotton stapling 7/8" and above from sterling areas including Brazil but excluding East Africa and Sudan would be licensed freely for the half year, provided imports were made against actual sales to mills. As the floor and ceiling prices of varieties other than Jarila had not been fixed, prices were not sustained. The market closed on the 31st August with the September contract quoting at around Rs. 506.

The statistical position of cotton in the Indian Union during 1947-48 was as under :—

Indian Union & Pakistan cottons. (In lakhs of bales.)

	(In lakhs of bales.)			
	7/8" and above.	Below 7/8" and above 11/16".	11/16" and below.	Total.
Estimated carryover on 1-9-1947				
{ (a) With mills ..	4.8	8.0	2.2	15.0
{ (b) With trade ..	3.0	13.0	7.0	23.0
	7.8	21.0	9.2	38.0
Estimated actual crop of Indian Union in 1947-48	5.0	16.6	10.3	31.9
Estimated receipts from Pakistan ..	1.8	1.5	..	3.3
Total supply ..	14.6	39.1	19.5	73.2
Mill consumption in Indian Union.				
{ Indian Union cotton ..	5.0	18.4	5.7	29.1
{ Pakistan cotton..	4.4	2.4	..	6.8
Total ..	9.4	20.8	5.7	35.9
Extra-factory consumption .. ..	..	0.4	2.3	2.7
Exports .. .. .	..	4.5	5.0	9.5
Total offtake ..	9.4	25.7	13.0	48.1
Estimated carryover with mills and trade on 31-8-1948	5.2	13.4	6.5	25.1
Carryover with mills on 31-8-1948 ..	3.5	7.9	2.4	13.8
Estimated carryover with trade on 31-8-1948	1.7	5.5	4.1	11.3

STAPLE LENGTH OF INDIAN COTTON.

The need for revising the staple length classification adopted in the Committee's report on the staple length of the Indian cotton crop of each season published in its Statistical Leaflet No. 1 was felt for some time in view of the marked changes that had taken place in the character of the crop since the classification was last revised in 1936. Further, until recently there was

no uniform definition of the terms 'long,' 'medium' and 'short' staple cottons as used by the various Departments of the Government of India and the Indian Central Cotton Committee. For instance, according to the definition then adopted by the Committee, these three terms covered cottons 'over 1", '7/8" to 1" and 'below 7/8", respectively, whereas the Export Trade Controller, Bombay, and the Textile Commissioner, Bombay, defined long, medium and short staple cottons as '13/16" and above,' 'below 13/16" and above 11/16" and '11/16" and below,' respectively. The question of revising the staple length details given in the Committee's Leaflet referred to above and the desirability of suggesting a uniform definition of the terms long, medium and short staple were accordingly referred to a Special Sub-Committee consisting of representatives of the Indian Central Cotton Committee, the East India Cotton Association, the Bombay Millowners' Association and the Southern India Millowners' Association. The Sub-Committee met in February 1948 and while recommending certain modifications in the grouping of some of the varieties and in their agricultural and technological details, suggested the following classification by staple length groups for adoption by the Committee, the Textile Commissioner and the Export Trade Controller, Bombay, in future :—

- | | | | |
|---------------------------|----|----|--------------------------------|
| 1. Superior long staple | .. | .. | 1" and above. |
| 2. Long staple | .. | .. | 7/8" to 31/32". |
| 3. Superior medium staple | .. | .. | 13/16" and 27/32". |
| 4. Medium staple | .. | .. | Below 13/16" and above 11/16". |
| 5. Short staple | .. | .. | 11/16" and below. |

With a view to assigning the different varieties to their proper staple length group under the revised classification, the following varieties included under the old staple length group '7/8" and above' have now been relegated to the group 'below 7/8" ' :—

- (1) Punjab L. S. S.
- (2) Karunganni strains.
- (3) White and Red Northerns.
- (4) Kumpta ordinary.
- (5) Westerns Farm (Hagari-1)
- (6) Mysore American—M.A. II.
- (7) Dharwar-American (Gadag 1).
- (8) Broach-Vijaya.

- (9) Hyderabad American.
- (10) Jarila.
- (11) C. P. Berar Verum.
- (12) Perso-American.
- (13) Tinnevellies other than Karungannies.
- (14) Punjab American 4F.

The above recommendations were approved by the Committee. The classification suggested has also since been accepted by the Export Trade Controller and the Textile Commissioner, Bombay.

The above classification together with the modified fibre particulars of the varieties included in each group as recommended by the Special Sub-Committee & approved by the full Committee has been given effect to in Statistical Leaflet No. 1 for 1946-47, issued during the year under review.

According to the official forecast, the cotton crop of the Indian Union (including Hyderabad State) during 1946-47 was estimated at 2,112,000 bales of 400 lbs. net. The proportion of the crop falling under each of the five staple length groups referred to above to the total formed 5, 15, 28, 21 and 31 per cent, respectively.

STATISTICS OF STOCKS OF COTTON HELD IN THE COUNTRY.

The statistics of stocks of cotton held by the mills on the 31st August each year are collected by the Committee from mills by direct enquiries on a voluntary basis. The figures of stocks held by the trade on the same date are obtained through the co-operation of Provincial and State Governments and trade bodies. To make the statistics of trade stocks as complete as possible, the Committee recommended, in 1944, to the Provincial Governments and States the introduction of legislation for the purpose. The Governments of Bombay, the Central Provinces and Berar, the United Provinces, the East Punjab and Baroda and Gwalior States have passed the required legislation. The Government of Madras propose to take similar action. Pending the introduction of legislation, the United States of Saurashtra and the Patiala and the East Punjab States Union have undertaken to collect the required data on a voluntary basis with effect from the 31st August, 1948. Good progress has thus been made in extending the area of the census and it is hoped that before long more comprehensive and reliable statistics of stocks would be available.

As the cotton crop season of the Madras Province is taken as the year ending 31st January, figures of stocks of cotton held in the province on this date are collected annually in addition to the figures relating to the 31st August. The relevant figures for the 31st January, 1948, together with comparative details for previous years, are given in Appendix V.

DEMAND FOR VARIOUS TYPES OF INDIAN COTTON.

Statistics relating to internal and export demand for the various types of Indian cotton are compiled from the information collected on a voluntary basis and are published in Statistical Leaflets Nos. 3 and 4. Such statistics are of great value to the trade and the industry and to those entrusted with the responsibility of shaping and directing the cotton policy of the country. The statistics relating to mill receipts and exports of cotton classified by varieties for the 1946-47 season were published during the year under review. During that season, mills in the Indian Union received 3,611,000 bales of all growths of cotton of which the shares of Indian Union, Pakistan and other foreign cottons were 55, 25 and 20 per cent, respectively. Out of the total exports of 882,000 bales from the Indian Union and Pakistan during 1946-47, the Indian Union alone accounted for 419,000 bales or 48% of the total.

INDIAN MILL CONSUMPTION.

Figures of consumption of Indian cotton in mills in Provinces and Indian States for the years 1933-34 to 1947-48 based on the monthly statements issued by the Committee are given in Appendix VI. From the 15th August, 1947, owing to the constitutional changes, the figures of consumption of cotton by mills in Pakistan are excluded and the consumption figures from that date refer only to the Dominion of India, including Indian States. By virtue of the Indian Cotton Cess (Amendment) Act, 1947, and consequent amendments made in the Indian Cotton Cess Rules, mills are required to furnish their figures for consumption of cotton under the three heads (i) Indian cotton, (ii) Pakistan cotton and (iii) other foreign cotton. It is proposed to publish the cotton consumption statistics under the three heads from September 1948. The total consumption of Indian and Pakistan cottons in 1947-48 amounted to 3,573,000 bales, being 425,000 bales higher than in 1946-47. The figures compiled by the Textile Commissioner, Bombay, indicate that consumption of Indian Union, Pakistan and other foreign cottons in 1947-48 was 29.1, 6.8 and 6.2 lakhs bales against 21.9, 9.8 and 7.0 lakhs bales, res-

pectively, in 1946-47. This noteworthy increase in the consumption of Indian cotton may be ascribed, apart from the price factor in its favour, to the difficulties of obtaining supplies of Pakistan cotton and the fortuitous increase of about six lakhs bales in the Indian Union's crop in 1947-48 as compared with 1946-47.

EXPORTS.

Exports of Indian cotton from the Indian Union during the season are estimated at 951,000 bales, against 1,005,000 for undivided India bales in 1946-47. Exports to the United Kingdom, the Continent, U.S.A., and other countries formed 8, 38, 6 and 48 per cent of the total exports during 1947-48, the corresponding percentages for 1946-47 being 19, 39, 11 and 31, respectively.

STATISTICS OF COTTON PRESSED.

During the season under review, 1,665,000 bales of cotton were pressed in the Provinces of the Indian Union and 1,029,000 bales in Indian States, making a total of 2,694,000 bales for all-India; the corresponding figures for 1946-47 were 1,234,000, 990,000 and 2,224,000 bales, respectively.

UNPRESSED (LOOSE) COTTON STATISTICS.

The statistics of cotton pressed do not account for the whole of the Indian cotton crop as, apart from the quantity utilised for extra-factory consumption, chiefly in the form of hand ginned cotton, mills situated near cotton growing areas often use considerable quantities of ginned, unpressed cotton. During the year, unpressed cotton equal to 220,000 bales was consumed in mills in the Indian Union against the same quantity in the preceding year. The relevant figures for the years 1933-34 to 1947-48 are given in Appendix VI to this report.

STATISTICS OF COTTON GINNED.

The figures of cotton pressed do not cover the entire crop, as, apart from unpressed lint consumed in spinning mills, for which figures are available, unpressed lint is also utilised for domestic purposes, such as hand-spinning, making of quilts, mattresses, etc., for which there are no reliable data. If ginning returns were instituted, all that would be required for arriving at the actual crop is a reliable estimate of the quantity of hand ginned cotton used for domestic purposes. The ginning and pressing returns would, at the same time, serve as a check on each other. The submission of ginning returns

is now in force in the Central Provinces and Berar, Bombay Province, West Bengal, the United Provinces, Madras Province, East Punjab and Ajmer-Merwara and certain Indian States.

IMPROVEMENT OF COTTON FORECASTS.

The examination of the accuracy of the cotton forecasts of the 1946-47 season has been held up owing to complete information relating to the rail and river-borne trade in cotton for that season not being available. The results of the post-mortem examination of the cotton forecasts of the five seasons ending 1945-46 were published during the year under report in Statistical Leaflet No. 5 entitled "Report on the accuracy of the all-India cotton forecasts of the five seasons ending 1945-46." It has been found that on the average of the five seasons in question, the cotton forecasts of undivided India were underestimated by 15% of the actual.

SUPPLY OF MONTHLY REPORTS ON INDIAN COTTON TO THE INTERNATIONAL COTTON ADVISORY COMMITTEE.

During the year under review, the Committee's office was entrusted by the Government of India with the work of supplying monthly reports on Indian cotton to the International Cotton Advisory Committee, Washington. Accordingly, the required information is being supplied from December 1947.

SCHEME FOR CROP ESTIMATING SURVEY ON COTTON IN THE CENTRAL PROVINCES AND BERAR.

The object of the scheme is to provide a suitable technique for conducting yield surveys on cotton which are considered to constitute the most reliable direct basis for estimation of the outturn of the crop. The scheme was originally sanctioned in July 1942 for a period of one year. It came into operation on the 15th October, 1942, the venue of the experiment being the Akola district. At its meeting in July 1943, the Committee agreed to extend the scheme to Buldana district for a period of one year. In July 1944, the scheme was extended to the whole cotton tract of the Province for a period of one year in the first instance, the object being to determine accurately the average yield of *kapas* per acre and the total production for the whole of the cotton area in the Province by the method of harvesting random plots. At the same time, it was intended to train the staff of the Land Records and Revenue Departments in the practical working of the method so that the work could ultimately be taken over by these Departments as a routine procedure for carrying out yield surveys.

In July 1945, the Committee approved of a further extension of the scheme for a period of one year. The practicability of the random sampling technique and the trustworthiness of the results obtained having been fully demonstrated by the first three years' work, it was considered necessary to take the experiment to the final stage in which the field work would be organised in such a manner that it could be entrusted completely to the staff of the Revenue and Land Records Departments primarily responsible for the yield survey work in the Province. In August 1946, the scheme was extended for a further period of two years, *viz.*, 1946-47 and 1947-48 (up to 31st March, 1948), the expenditure to be shared between the Committee and the Provincial Government on a 50:50 basis, subject to the condition that at the end of that period the Provincial Government would take up crop estimating survey as an annual routine at their own cost.

The survey in 1947-48 was the fourth provincial survey carried out for estimating the average yield per acre and the total production for the Province by the random sampling technique. The survey was conducted on the lines of the previous year except that 8 more villages were sampled in the Nagpur district with a view to increasing the accuracy of the yield estimates of that district.

According to the survey, the total production of lint for 1947-48 calculated on the basis of actual acreage and the actual ginning outturn based on information obtained from principal cotton ginning factories was estimated at 550,940 bales for the whole province, with a standard error of 13,108 bales. The average yield of *kapas* per acre for the province was estimated at 220.7 lbs. with a standard error of 5.3 lbs. or 2.4%, the average yield in Berar being 25.6 lbs. (or 12.7%) higher than that in the Central Provinces.

As in the previous year, the survey was utilised to supply timely estimates for the third, fourth and final forecasts of yield this year also. As compared with the actual yields obtained under the survey, the yield was underestimated both in Berar and the Central Provinces in the third forecast based on anna valuation of survey plots in November. The fourth forecast which is made when the crop is harvested agreed very closely with the actual yield all over the Province except for Amraoti district where a few bolls matured late in the season but their produce was not harvested because of the high cost of picking. The final forecast was identical with the actual yield.

Provisional figures for district standard outturns calculated from the results of the survey indicate that the present official district figures are pitched at a very high level. It is proposed that as from 1948-49 these figures should be replaced by quinquennial average of mean district yields based on survey results when the provincial survey will have completed 5 years.

The survey was conducted under the technical and administrative control of the staff of the Land Records Department. As it is to become a part of the normal duty of that Department, it has been recommended that these experiments should be included in the curriculum of the Patwaris' and Revenue Inspectors' examinations.

PUBLICATIONS.

The following statistical publications were issued during the year under review :—

- (1) Statistical Leaflet No. 1—Fourteenth Issue (1946-47) Report on the staple length of the Indian cotton crop of 1946-47 season.
- (2) Statistical Leaflet No. 3—Fourteenth Issue (1946-47) Receipts at mills in India of raw cotton classified by varieties, 1946-47.
- (3) Statistical Leaflet No. 4—Fourteenth Issue (1946-47) Exports by sea of Indian raw cotton classified by varieties, 1946-47 season.
- (4) Statistical Leaflet No. 5—Seventh Issue (1941-46), Report on the accuracy of the all-India cotton forecasts of the five seasons ending 1945-46.

CHAPTER IV.

RESEARCH.

Most of the research schemes of the Committee are concerned with the improvement of the race of the plant, the object being to enable the grower to secure the greatest profit. To do this there have to be taken into account the yield per unit area and the quality of the lint, on which demand and price depend. A number of research schemes, among which the most important are those for cotton breeding for the improvement of quality, are in operation in the various cotton growing Provinces and States. The majority of these schemes are financed entirely by the Committee, while the cost of others is borne partly by the Committee and partly by the Provincial or State Governments concerned. The Committee also makes grants to Departments of Agriculture in the various cotton growing Provinces and States for specific investigations on cotton, not necessarily confined to the breeding of new varieties, the aim being to arrange for a well-directed co-ordinated effort for the improvement of every aspect of cotton in India. Since January, 1943, the expenditure on new schemes and extensions of old schemes sanctioned by the Committee, which are for the benefit of cotton growers, is being met from the Cotton Fund at the disposal of the Government of India. Research on cotton technology is carried on at the Committee's Technological Laboratory and in addition trained Technological Assistants are posted at the Cotton Research Stations at Surat, Dharwar, Coimbatore, Indore and Nanded to help the botanists in charge in their work of breeding improved varieties of cotton.

COTTON TECHNOLOGY.

The research and testing work was maintained at the level attained in the past. Valuable assistance was rendered to Cotton Breeders, cotton trade and textile industry by carrying out tests for them and giving them technical information and advice. The area under improved varieties, mainly of medium and long staple types, brought about with the help of the tests at the Laboratory by the Indian Central Cotton Committee in collaboration with the Provincial and State Departments of Agriculture, was 56 per cent of the total cotton area. The total number of samples received for tests of all kinds was 1248 in the year and 259 reports were issued on them.

A new micro-spinning technique suitable for Indian cottons was evolved by which it is possible to spin and estimate with reasonable accuracy the spinning quality of so small a quantity of lint as 2 oz. Thus, the produce of even a few plants would be enough for a spinning test which would prove of immense help in the selection of improved strains at a very early stage.

A ginning technique for small samples was standardised and recommended for use by all Cotton Breeding Stations. A balance of the cement balance type was designed for rapid and direct determination of ginning percentage of cotton for use by the Cotton Breeders. A small gin of the Macarthy type that could be used for small samples of *kapas* (seed cotton) was devised for use in Cotton breeding work. A modified type of Bardoli gin in which seed-crushing is practically eliminated and an instrument to measure the strength of attachment of fibres to cotton-seed were also designed.

Experiments on *kapas* samples were made with a view to ascertain the relative efficiency of the pre-cleaning machines and to evolve technique of cleaning *kapas* to obtain better quality lint. The cause of difference between the spinning performance of saw-ginned and roller-ginned samples of the same cotton were investigated. Comparative ginning tests at upcountry ginning factories and at the Laboratory were completed on two varieties of cotton.

A suitable standard technique for halo-length determination is being evolved for adoption at all breeding stations.

Tests carried out on agricultural samples included tests on certified Vijay grown at different centres in middle Gujarat and Baroda State, comparative tests on hybrids to replace Jarila, tests on Gaorani 6 of different generations and produced with different doses of manure, comparative tests on Jawahir and Jayawant on the one hand and Subhas and Gadag 1 on the other, tests on district trials of Suyog and Type 1-4, tests on long staple types bred at Coimbatore and Avanashi, tests on *desi* and American varieties grown in the United Provinces, tests for the effect of exposure of cotton-seeds to X-ray tests on Narma Cotton, tests on bast fibres as substitute for jute, tests on long staple hybrids grown in Surat and Sea Island Cotton grown in North Canara.

Spinning tests were made, as usual, on representative standard and trade varieties of Indian cottons, the results for which were published for general information of the trade and the industry in technological bulletins and circulars.



The Technological Laboratory, Matunga, Bombay.

Tests on 391 samples of various textile fibres, yarns and cloths as compared with 279 last year, were made in the Testing House of the Laboratory on behalf of firms and mills. These included 12 samples of cloth sent by a firm to ascertain whether they were hand-spun and hand-woven, 14 samples of belting by the Indian Tariff Board for analysis and 13 samples of surgical catguts for report on quality. The total number of samples tested in the Testing House alone amounted to about 5,600 in the past 12 years.

Good progress was recorded in technological investigations, some of which were of a fundamental nature while others were of direct practical value to the trade and the industry. Causes leading to neppiness in Indian cotton yarns are being investigated in detail. Causes of abnormal spinning performance of certain Indian cottons having longer staple but spinning lower were investigated. Formulae were developed to estimate the spinning value of different botanical varieties which were more precise than those derived for them from Technological classification previously. The influence of different lengthgroups of fibres in yarn strength is being studied. Indian trade bales of Cambodia Co.2, Jarila and P. A. 124F were stored in upcountry centres and in Bombay in order to study the effect on the quality of lint. It was found that all these three varieties had maintained their yarn-strengths even after a year's storage. Plain cloths are being manufactured in the Victoria Jubilee Technical Institute from the carded and combed yarns prepared from Sind M4 and Sultani (199F) cottons with a view to compare them with the cloths prepared from carded Kampala yarns. Tests on medium staple Indian cottons regarding their suitability to manufacture hosiery yarns were made. Optimum conditions for partial acetylation of cotton fibres with a view to render them highly resistant to mildewing, rotting and other attacks from micro-organisms are being worked out. In addition, several batches of chemical cotton were prepared from linters by the method specially evolved at the Laboratory. Many lengths of cellulose sheets had been produced by the viscose method and efforts are being made to make them fully transparent.

In addition to the above investigations, work is in progress on the spinning quality of mixings of Indian cottons with special reference to their fibre-properties, on the effect of agronomical factors on the physical properties of the cotton fibre and on the use of Air Permeability apparatus for determining the fineness of cotton. The work of the scheme on the survey of cellulose bearing materials in India financed by the Council of Scientific and Industrial

Research was continued and a paper on the investigations on some promising cellulose bearing materials (other than cotton) for the manufacture of rayon was sent for publication.

FUNDAMENTAL RESEARCH WORK ON COTTON.

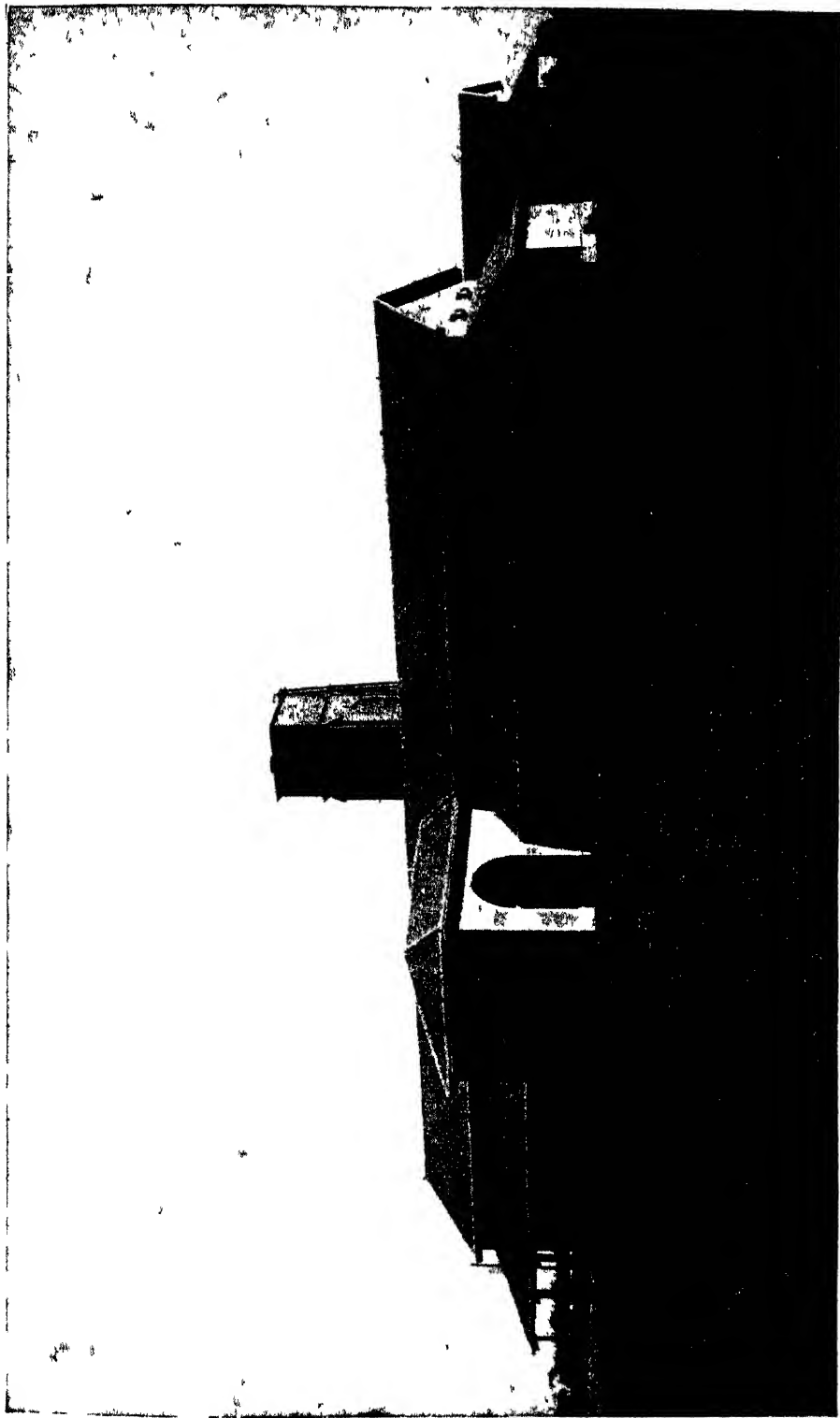
1. Genetics.

(i) **Chlorophyll deficiencies.**—F₂ grown during the season from the crosses of normal plants with chlorophyll deficient ones observed during 1946-47 showed a simple monogenic segregation, normal greenness being fully dominant. Further, this gene for chlorophyll deficiency was found to be linked with R₂ locus giving only 10% cross-overs. It, therefore, appears to be identical with the gene observed by Yu (J. of Genetics, 1940) and represents another case of recurrent mutation.

Extensive observations carried out during the past two seasons with regard to the occurrence of the yellow tissue (variegation) show that this may occur at any time or on any part of the plant belonging to any species of the cultivated Asiatic cottons although with varying frequencies. Heritable nature of variegations is doubtful.

(ii) **Lintlessness.**—During the season, work on the lintless genes in Asiatic cottons was commenced with the object of extracting the different lint quantity genes present in various standard strains of Indian cottons in order to study their genetics and a number of crosses were accordingly made during the season.

(iii) **Fuzz colour.**—It is known that a commercial sample of seed of Buri 107 is usually a mixture of green and white seeds and it was decided to explore the possibility of evolving substrains of Buri 107 of uniform fuzz colour and also to study the relationship, if any, between the fuzz colour and economic characters. A fresh sample of Buri 107 was obtained from the Economic Botanist, C.P., and as usual it consisted of a mixture of white and green seeds. There were, however, a number of intergrades which it was difficult to classify. The sample was, therefore, divided into two extreme classes, viz., green and white, and 120 seeds of each class were sown. In the green seed group 36 plants were obtained of which 32 produced exclusively white seed, three produced green seeds and one produced seed of intermediate fuzz colour. In the white seeded class 54 plants were obtained, all of



The Institute of Plant Industry, Indore.

which produced white seed. This indicates that in most cases the green colour of fuzz may be due to non-genetic causes

(iv) **Interspecific hybridisation.**—It was pointed out in the last year's report that work had been in progress at Indore to introduce the drought and disease-resistance of the American wild species, viz., *G. thurberi* and *G. raimondi* in the cultivated cottons. These two species were crossed to *G. arboreum* and *G. hirsutum* respectively and the hybrids doubled by colchicine. These doubled hybrids and their progenies were, back-crossed to either *G. hirsutum* or to *G. hirsutum* and *G. barbadense* in order to restore fertility. Last year 680 and 10 fertile plants were obtained from *thurberi* and *raimondi* crosses respectively. During the year under report, progenies were grown from these plants and the details of the material obtained from it are summarised below :—

			No. of seeds sown.	Germi- nation stand.	Final Stand.	No. of fertile plants.
<i>G. arboreum</i> x <i>G. thurberi</i>	} Doubled x	<i>hirsutum</i> ..	20588	4760	4204	1814
		<i>barbadense</i> ..	995	432	306	86
<i>G. hirsutum</i> x <i>G. raimondi</i>	} Doubled x	<i>hirsutum</i> ..	122	38	30	15

The above 1915 fertile plants show a wide range of economic characters, particularly, halo-length. In the coming year, progenies will be grown from about 1,000 plants characterised by earliness, good boll bearing and long staple and rest of the material will be grown as a variable bulk.

(v) **Effect of agronomic factors on the yielding capacity of the seed.**—This was the second season's trial to find out the preformance of sowing seed obtained from a crop grown under different agronomic conditions in the preceding season. This year seed of Jarila obtained from 36 agronomic treatments due to 4 levels of spacing between plants (18", 12", 6" and 3"), 3 levels of manuring (0, 40 lbs. of nitrogen as $(\text{NH}_4)_2\text{SO}_4$, and 40 lbs. of nitrogen as NaNO_3), and 3 types of seed density (water, saline, control) was sown in 4 randomised blocks with uniform spacing, individual plot size being 32' x 4'. Results obtained showed that (1) the seed obtained from widely spaced crop gave much better yield of *kapas* than the one obtained from the closely spaced crop, (2) the seed obtained from manured plots gave lower yield,

and (3) the crop grown from heavy seeds gave seed which yielded better than the one obtained from a crop from lighter seed.

(vi) **Vernalisation.**—(a) **Cold treatment.**—It was pointed out in the last year's report that the cold treatment given to seed of X4463 in 1944-45 had brought about a change of permanent nature in the genotype of the strain which in two seasons gave significantly higher yield than untreated and in one season significantly lower yield. In the season under review, it was noticed that this seed again gave a 40% more yield than the untreated bulk seed of X4463. Thus the four seasons' results obtained hitherto, show that whereas the cold treatment failed to achieve the object of vernalization, it probably brought about some genotypic change. The material obtained from last year's trials will be tested for its performance against X 4463 in large plot size in the coming season.

(b) **Heat treatment.**—During the year under report, an experiment was started to study the effect of giving constant treatment of 28° C for 10, 20 and 30 days to the seed of Dhar 43 and Indore 1. The treated seed when sown in the field failed to germinate. It is proposed to continue this experiment in a modified form in the coming season.

2. Agronomy.


(i) **Long term rotational and manurial trial.**—On the basis of the recommendations made in Dr. A. B. Stewart's report on soil fertility investigations in India, a comprehensive experiment was commenced at Indore in the year under report in order to study the effect of crop rotations, nitrogenous manuring with inorganic and organic manures and addition of phosphate on soil fertility. The experiment is to continue for a period of 12 years in the first instance, and in addition to measuring the growth and yield of crops, the soil will also be analysed for chemical and physical characters at intervals.

Two rotations, the traditional jowar-cotton-wheat rotation and the improved four course rotation with the inclusion of groundnut in between jowar and cotton, are being compared. Nitrogen and phosphate are applied at the rate of 20 lbs. nitrogen and 20 lbs. P_2O_5 per acre and sources of nitrogen compared are farm yard manure, groundnut cake and ammonium sulphate. Phosphate is applied in the standard form as superphosphate. Frequency of manuring, whether once, twice or thrice, during each rotation is also a factor

under study. There are in all 72 manurial treatments in each crop plot. The experiment is laid out in an average field. The results of the first year's cotton yields are summarised below :—

Nitrogen increased yield significantly and although the difference in yield due to different sources of nitrogen was not quite significant, ammonium sulphate ranked at the top followed by groundnut cake and farm yard manure. Phosphate applied in addition to nitrogen increased yield significantly beyond the average of the yield from nitrogen and phosphate applied singly ; but the different forms of nitrogen did not differ significantly in their interaction with phosphate. Yield figures showing average effect of different treatment are given below :

Yield of kapas in lbs. per acre.

No manure.	Ammonium sulphate.	Groundnut cake.	F.Y.M.	
251	316	295	273	
				
S.E.	10.3	17.9		
Nitrogen alone.	Phosphate alone.	Nitrogen plus phosphate.	S. E.	Sig. diff.
295	273	317	4.8	13

(ii) **Soaking of seed in nutrient solution.**—In the preliminary trial reported last year, there was an indication that soaking of cotton seed for 24 hours in solutions of potassium phosphate prior to sowing resulted in an increase of boll number and yield. The trial was repeated in the year under report with the addition of three more salts, ammonium sulphate, ammonium phosphate and potassium nitrate. The solutions employed were $1\frac{1}{2}$, 1 and $\frac{1}{2}$ molar in strength as in the previous year's test. The soaking was done either a month before sowing and the seed dried and stored or the seed was soaked just before sowing. The control seed was similarly soaked in plain water. Dry unsoaked seed was also sown for comparison. The same four varieties, two *desi* and two American, as were tried last year were included.

Yields of *kapas* per plant for the different nutrient solutions are given below for each variety separately :—

Yield of *kapas* in gms. per plant.

Variety.	Ammonium sulphate.	Mono-Potassium phosphate.	Ammonium phosphate.	Tri-Potassium phosphate.	Potassium nitrate.	S. E.	Control.	S. E.	Dry.	S. E.
Jarila ..	10.2	8.7	7.1	5.0	4.4	0.31	3.6	0.38	2.9	0.54
Dhar 43 ..	9.8	8.0	7.5	6.0	5.5	0.34	3.8	0.41	3.0	0.58
M. U. 4 ..	8.5	7.9	4.3	4.1	3.9	0.23	3.1	0.8	2.9	0.40
X 4463 ..	7.6	7.	5.	5.4	4.9	0.29	3.5	0.35	2.6	0.50

The results are striking. The soaking in nutrient solutions has increased yield over the control in all varieties although the effect is somewhat greater in the two desi varieties than in the American varieties. The behaviour of different nutrients is consistent in the different varieties. Ammonium sulphate followed by mono-potassium phosphate (KH_2PO_4) has brought about the highest increase, the yield for the two nutrient solutions being 2 to 3 times the yield of the control. It is interesting to note that soaking in plain water (control) has given a slight increase over sowing of dry seed presumably because the absorption of water from the soil and germination are quickened in the former. The different concentrations of the nutrient solutions or the two methods of soaking have made no significant difference. The experiment is being repeated in the coming season.

3. Statistics.

(i) **Field technique. Study of incomplete block designs.**—An important point being investigated in connection with the study of efficiency of incomplete block designs is to specify the conditions under which these designs are likely to be profitable. This is necessary in view of the fact that different results have been obtained by different workers with these designs. The studies made at Indore have not generally shown these designs to be as efficient as they have been found in America. The efficiency of the incomplete block design is a function of the intra-class correlation within the complete blocks and within the incomplete blocks. The relationship may be expressed as

$$\text{Efficiency} = \frac{\frac{1}{kf}}{\frac{r_1}{r_2}} \left(\frac{1-r_2}{1-r_1} \right) \quad \text{where}$$

k and f are constants characteristic of the design, λ is the ratio of the true variances between the complete and incomplete blocks and r_1 and r_2 are the intra-class correlation coefficients within incomplete and complete blocks, respectively. These coefficients were actually calculated for a number of designs with cotton and jowar and it was observed that as required by the above relationship, the incomplete block design was superior to simple, randomised blocks where r_1 was relatively large and r_2 small simultaneously. This problem is being studied further.

(ii) **Study of genetic variability and selection in quantitative characters.—**

The method of estimating genetic variability by taking the regression of progeny means on parent values was examined further. The method is strictly valid and provides an unbiased estimate of genetic variance only in self-fertilized plants in the absence of dominance. It is also valid when biparental progenies from random crosses are involved even in the presence of dominance. In self-fertilized plants, the method as employed in practice is shown to over-estimate genetic variability when the character concerned is subject to dominance. The degree of over-estimation is highest when dominance is complete and when heterozygotes form the largest proportion of the population as in F_2 . An alternative method is the estimation of variance between progenies grown from selfed seed of the parent plants. As an estimate of genetic variance of the parent population, this estimate has been shown to be better than the regression estimate as the amount of over-estimation is half by the former method as compared to the latter method. Estimates of genetic variance were calculated by the two methods for halo-length in Malvi cotton from various localities in Central India. These results have been published. (Panse and Bokil J. Ind. Soc. Agric. Stat. 1948, Vol. I, pp. 80-91).

(iii) An experiment is in progress to study the relationship between genetic variability and response to selection. In six of the several *arboresum* crosses, which had been made for a statistical study of the genetics of quantitative characters and the results of which were discussed in earlier reports, selection for high halo-length and for low halo-length has been continued from the F_3 onwards. Results upto F_7 , which was grown in the year under report, were reviewed in a preliminary way and are found interesting. The method of selection followed is first to select progenies with the highest and lowest halo-length means in each cross and grow replicated progenies next

year from plants with individual highest and lowest values for the character, adjusted for soil differences as far as possible. The progress by selection is shown below :—

Cross.	Mean halo length in F ₃ . (millimetres.)	Selection for halo-length.	Mean halo-length of selected progenies (millimetres.)			
			F ₄ .	F ₅ .	F ₆ .	F ₇ .
1. D77 x Shan 764	22.5	High ..	25.3	27.6	29.5	31.0
		Low ..	20.4	19.8	19.4	20.8
2. D77 x Gao.115	23.3	High ..	25.4	26.9	27.9	29.9
		Low ..	20.5	20.0	20.4	21.2
3. Cwn.520 x Sh. 764	24.6	High ..	25.9	27.4	28.9	30.4
		Low ..	22.9	20.9	21.6	22.1
4. B.G. x Sh. 764	24.1	High ..	25.8	28.2	28.3	29.7
		Low ..	21.5	20.4	21.6	21.1
5 B.G. x Jarilla	26.4	High ..	27.2	29.2	31.8	32.8
		Low ..	22.8	23.5	23.9	24.5
6. R 10 x Sh. 764	23.3	High ..	24.3	26.9	27.4	29.2
		Low ..	20.2	19.9	21.0	20.9

The most outstanding result is that whereas there is a steady improvement of mean values in the high lines of all crosses as a result of continued selection, the effect of selection in the low lines seems to have come to a standstill either in the first or second generation. In the first cross (D77 x Shan. 764) progress continued for three generations and then ceased. This cross differs from the rest in its response to selection in the high line also. The rate of improvement by selection for high values in this cross is distinctly better than the other crosses which do not seem to differ much among themselves. The gross variance in the F₂ generation of the cross D77 X Shan 764 was also much greater than in the other crosses, although the genetic component of the variance did not differ appreciably from the other crosses. The observed progress has thus been determined by gross variance which would include

the effect of dominance. The results indicate a considerable influence of dominance, and in the cross D77 \times Shan. 764 also the influence of a larger number of genes affecting halo-length. Further work is in progress to elucidate these points.

(iv) **Discriminant function for selection of yield in cotton.**—The results of an experiment with 210 Malvi progenies have been analysed and the following coefficients have been obtained for the discriminant formula for yield of seed cotton (with and without the ginning percentage being taken into account) and for lint.

	Yield of seed cotton.		
	With ginning percentage.	Without ginning percentage.	Yield of lint.
b1 (No. of bolls per plant)	0.5002	0.5820	0.4209
b2 (No. of seeds per plant)	0.1720	0.1802	0.1920
b3 (wt. of seed cotton per seed)	1.0000	1.0000	1.0000
b4 (ginning percentage)	-0.2855	..	0.6295

Comparing these coefficients with those obtained in previous experiments carried out for studying this problem, it is seen that the coefficients for the different components are of the same order relatively, in all trials. In the present formula, however, the coefficients for other components are somewhat lower in comparison to that for weight of seed cotton per seed (b_3). The problem of the efficiency of the discriminant function as compared to straight forward selection is being studied.

Scheme for interspecific hybridisation in cottons at Surat.—This scheme was sanctioned by the Committee in January 1938, for a period of five years, with the object of obtaining, if possible, fully fertile hybrids between Asiatic and American cottons, combining the useful agronomic characters of both, particularly the good staple length of the American and hardiness and adaptability to Indian climate of the Asiatic. Work on crossing Asiatic and American cottons, began at Surat in 1932, had already yielded 23 hybrids in which the American parents used were mostly the acclimatised Upland types from different parts of India, while the Asiatic parents were forms of *G. herbaceum* and *G. arboreum*. The hybrids produced from these were, however, sterile and efforts to induce fertility in them were successful only

when they were back crossed to American types. In January 1940, the Committee sanctioned an expansion of the scheme so as to include cytological studies during the remaining period of its continuance. In July 1943, the scheme was extended for a further period of five years from the 1st November 1943, in March last another interim extension of the scheme for a period of six months from the 1st November 1948 was sanctioned.

During the year under review, ten synthetic types derived from fertile backcrosses of (American \times Asiatic) \times American were grown in replicated tests. One was significantly superior to both the controls Co.2 and Suyog, five were bracketted with Suyog and seven with Co.2, for yield. Growth of Co.2 was very healthy this season and its yield was almost as good as that of Suyog. Of the above, 3 types are promising as they have also good combination of ginning percentage (38.5 to 40.4) and staple length (0.97" to 1.03") as against 38.1 and 40.0 ginning percentage and 0.95" and 0.99" staple length of Co.2 and Suyog, respectively.

Out of the 45 progenies representing 9 families grown under compact family block, 8 have been retained for further work on the basis of good yielding capacity, high ginning percentage (more than 38%) and staple length above 25 mm. Additionally, 237 progeny row cultures were tried in triplicate plots during this season. Two of them were significantly superior to Co.2 and 38 were bracketted with it for yield. The ginning percentage ranged from 38% to 42.2% (as against 36.7% of Co.2) and staple length ranged from 25 to 28 mm. (as against 23.5 mm. of Co.2). Special attention is now being paid for selecting progenies having fibre length above 28 mm. and ginning percentage 35% or more, and satisfactory yield.

Material from interspecific hybrids was sent to six places. The derivatives from B.C. 68 (B.C. 125 \times Co.2) and (B.C. 134 \times Co.2) were promising either for combination of yield, ginning percentage and staple length or for staple length alone at Viramgam and Broach under dry conditions and at Padegaon and Kopargaon under irrigated conditions. It was also confirmed that most of the derivatives were distinctly longer in staple length than the local check varieties, both Indian and American, at all the places under trial.

Preliminary tests of the produce of first generation hybrid of Bourbon \times Sea Island (5th year ratoon) show that it is possible to produce lint of nearly $1\frac{1}{4}$ inch staple length which is also strong and superfine and roughly estimated to spin upto 70-75 counts, by using hybrid seed of such crosses and taking advantage of the dominance of desirable characters.

Selling of flowers by fixing wire rings over unopened buds.



By Courtesy—I.C.A.R.

Wild species of cotton are being used in crosses with cultivated cottons for introducing resistance to pests and diseases like jassids, thrips, black-arm etc., affecting the cotton leaf. Some of the material has reached third back cross generation showing great resistance particularly to jassids.

Cytological work is in progress to elucidate the behaviour of plant populations raised from crosses of synthetic hexaploids involving wild species with cultivated cottons.

PHYSIOLOGICAL RESEARCH.

Scheme for Cotton Physiological Research, Indore.—Arising out of the work done in the Punjab under this scheme and in view of the desirability of investigating the applicability of the results achieved under it to other areas, the Committee, at its meeting in January 1944, sanctioned a new scheme for Cotton Physiological Research with headquarters at Indore. Under this scheme it was proposed to do work in three cotton tracts, viz., (1) irrigated, (2) partially irrigated and partially rainfed and (3) totally rainfed. The aim was to obtain, as far as possible, precise knowledge of the inter-relationship between the soil and climatic factors and the growth of different varieties of cotton and then attempt to apply the knowledge gained into practice for improving the quality and yield of cotton in general. In February 1947, the scheme was extended for a period of five years, with effect from the 1st March, 1947.

During the year under report, a preliminary replicated field trial was conducted at Indore to study the effect of molybdenum, boron, copper, magnesium, iron, zinc, manganese and chromium on the growth and yield of cotton. Observations made on the crop revealed that the crops treated with zinc, manganese and chromium were definitely greener in appearance than the crops under other treatments. There was also a significant increase in the yield per plant as well as per acre varying from 20 to 25% over the control. If these findings are confirmed in the next season, similar trials will be conducted in other cotton tracts and an effort will be made to determine the part played by these elements in the nutrition of the cotton plant.

The interrelationships of sowing time, spacing and manuring on the growth and yield of cotton were determined on two soil types, viz., (1) soils that become waterlogged during monsoon and (2) well drained deep soils. It was observed that the optimum sowing period for cotton varied according

to the soil type. It was found to be between 25th May and 10th June on water-logged lands and 1st June and 20th June on well drained lands. Rain sowings on water-logged lands gave poor yields of about one maund per acre.

Spacing of cotton was found to be an important factor in increasing the yields per acre. The existing practice in Central India is to plant cotton at a distance of $1\frac{1}{4}$ feet to $2\frac{1}{2}$ feet between rows. Experiments have demonstrated the need for closer spacing and $\frac{1}{2}$ sq. ft. per plant equivalent to 9 inches between rows and eight inches between plants or 12 inches between rows and six inches between plants has been found to be the optimum spacing. Wider or closer spacing than $\frac{1}{2}$ sq. ft. per plant decreased the yield. Similarly closely spaced crops were found to be more benefited by manuring than widely spaced crop.

The study of the effect of water-logging on the growth and the mineral uptake of the cotton plant revealed that the growth of the crop completely stopped during the rainy months and there was no increase in dry matter in early as well as rain-sown crop, even though buds and flowers developed in the former. There was a decrease in concentration of nitrogen and lime (on % dry matter) in the leaves of early sown crop during the same period. These results suggested that the uptake of these two nutrients during the period of water-logging did not occur as there was no increase in total dry matter and the decrease in concentration in the leaves was caused by the translocation of these nutrients to the developing buds, flowers and bolls. The concentrations of potash and phosphoric acid in the leaves however remained almost constant and were not found to decrease during the same months indicating that these nutrients were absorbed even when water-logging occurred. This was another new finding that would require confirmation

In order to confirm the above conclusion, nitrate and ammoniacal nitrogen of the soil were determined from the same field during the period July to August at small intervals and it was found that a small accumulation of nitrate nitrogen especially in the top six inches of the soil occurred during the period of water-logging indicating that it was not absorbed by the crop. There was no indication of an accumulation of ammoniacal nitrogen during the same period.

The relation between sandiness of a soil and the magnitude of the response to manuring has been established by conducting 16 trials in the different parts of south and east Sind. The results with one exception indicated that

wherever the soils contained more than 50% of sand in the first two feet, a high and profitable response to the fertilizer was obtained and the response was low where the sand percentage was less than 50%. Thus it was highly profitable to manure cotton growing on light sandy soils.

The green-red leaf in American Upland cottons growing in black cotton soils under rain-fed conditions has been found to develop at three stages on growth : (1) vegetative phase ; (2) reproductive phase and (3) at the termination of the reproductive phase in the month of January or February (at Indore) when the dormant buds developed into new small leaves which were either red or green.

The reddening that occurred during the reproductive phase was the most common of all. It was found that the application of sulphate of ammonia to black cotton soils invariably hastened the development of reddening in leaves which was noticeable in pronounced form two to three weeks earlier in the manured plots than in the unmanured plots. It was also found that application of sulphate of ammonia to black cotton soils hastened the maturity of the crop. The index of earliness determined according to Bartlett's formula was found higher in the manured plots than in unmanured plots. Early maturity suggested early depletion of food nutrients or some early change in the metabolic activity of the leaves which may bring about formation of the red pigment. Thus it was expected that the time of reddening may vary to a small extent from field to field according to the differences in the time of crop maturity.

It may be stated that the application of sulphate of ammonia was also found to hasten maturity in the *herbaceum* cottons grown at Surat and *arboreum* cottons grown at Indore.

It is at present not understood why manuring should make the crop early or hasten reddening of the leaves in black cotton soils. The case was quite opposite for yellow-red leaf that developed in American cottons on light sandy lands in Sind, where manuring with sulphate of ammonia was found to remedy or delay the onset of the yellow-red leaf and to cause a delay in the arrival of the crop.

In order to prove experimentally that the maturity of crop and the leaf reddening were directly or indirectly interrelated, plants in a properly replicated experiment were not allowed to reach normal maturity by the removal

of buds as soon as they appeared from the month of September onwards. The control plants were allowed to flower and fruit normally. It was found that the leaves remained deep green uptill the end of the season in the debudded plants while reddening appeared in the control plants in the month of November.

Further investigations on the effect of spacing on growth and yield of cotton in the black cotton soils at Surat again supported the previous finding that nitrogen remained accumulated in the leaves of plants under wider spacing as phosphate was not available in adequate quantity. If phosphate was, however, added, nitrogen came to be utilised and higher yields were obtained. The chemical analysis of the leaves of 1946-47 experiment revealed that the application of phosphate to the soil had significantly increased the phosphoric acid content of the leaves and the leaves of plants treated with nitrogen had been more depleted of phosphoric acid content than the leaves of plants not treated with nitrogen, indicating that more phosphoric acid was utilised for fruit formation in presence of nitrogen.

BREEDING OF IMPROVED VARIETIES.

COTTON RESEARCH IN PROVINCES AND STATES.

BOMBAY.

(a) **Broach Cotton Breeding Scheme.**—The Cotton Breeding Scheme at Broach has been in operation since April 1932. The original object of this scheme was to obtain, by selection or hybridization, suitable types of cotton possessing wilt-resistant, high yielding, high ginning and superior spinning qualities, to replace the local mixture, a large proportion of which consisted of *Goghari* a short staple, high ginning (40%) variety. In view, however, of the Committee's policy to replace, wherever possible, short staple with medium and long staple cottons, attention is now being concentrated on wilt-resistance, high yield and fibre length.

The breeding of wilt-resistant types originally formed part of the Broach Breeding Scheme, but as it was considered desirable that this work should be done under optimum conditions of wilt infection, and as the required conditions, especially soil temperature in pots, were difficult to maintain at Broach, this part of the work was transferred to Poona, in June 1935, together with similar work on cottons for the Jalgaon tract.

During the year under report, the bulk seed of ten promising cultures from crosses of B.C. 1-2 and 1027 A.L.F. along with No. 3652 (wilt-resistant type bred at Shera) with B.C. 1-2 as check were tried in randomised replicated tests in wilt-free soil. Five cultures were significantly superior to B. C. 1-2 in respect of seed-cotton yield, while the rest including No. 3652 were bracketted with it. In respect of lint yield, three of the five were significantly better and five including No. 3652 were as good as B.C. 1-2. As regards ginning percentage, 6 cultures were as good as B.C. 1-2 and the remaining were significantly lower. In staple length all of them were superior to B.C. 1-2 by 0.2 to 1.2 mm.

In wilt-sick soil, B.C. 1-2 and 2 other families from crosses of B. C. 1-2 and 1027 A. L. F. were completely free from mortality and partial wilting, while the remaining families and 1027 A. L. F. suffered to an extent of 0.7 to 3.5% mortality and 1.1 to 66.2% partial wilting, respectively. The average yield per plant in all the families was higher than B. C. 1-2 and 1027 A. L. F. used as checks. The ginning percentage ranged from 37.1 to 42.1 as against 41.8 and 33.8% of B. C. 1-2 and 1027 A. L. F., respectively. In staple length, all of them were intermediate between B. C. 1-2 (23.0 mm.) and 1027 A.L.F. (24.9 mm.)

Three hundred and forty promising single plant selections from the additional material of the crosses and back-crosses of 1027 A. L. F. with B. C. 1-2, B. C. 1-6 and B. C. 5-18 were grown in single rows. From these, 134 cultures having ginning percentage from 37.0 to 46.2%, staple length from 22.1 to 24.3 mm. and freedom from wilt have been retained for further work.

Ninety two early maturing wilt-resistant selections with ginning percentage ranging from 38.0 to 41.6%, and staple length from 21.5 to 22.8 mm. from the crosses and back-crosses of B. D. 8 Early, Maktampore Early 2-3 and 2-5 with B. C. 1-2 and B. C. 1-6 were grown in progeny rows. Of these, 45 progenies have been selected for further work. They have the ginning percentage ranging from 39.5 to 45.4 and staple length 20.1 to 22.7 mm. as against 42.1 ginning percentage and 22.2 mm. staple length of B. C. 1-2.

The results of spinning tests of 1946-47 show that Farm Vijay and District Vijay Stage 'A' gave practically the same spinning performance *viz.*, 38's H. S. W.C. While District Vijay Stage 'C' and 'B' were lower in spinning capacity by 2 and 6 counts, respectively, all the four samples of Vijay were equal in fibre length as well as as in fibre weight per inch.

Vijay cotton (B. C. 1-2) was multiplied on an area of 3 acres for supply of pure seed to the Vijay Seed Multiplication and Distribution Scheme for Middle Gujarat and 1140 lbs. selfed and 520 lbs. open fertilized seed was produced this season.

(b) **Jalgaon Cotton Breeding Scheme.**—This scheme has been in operation since April 1932. Its original object was to obtain, by selection or hybridisation, suitable wilt-resistant types with heavy yielding, high ginning and good spinning qualities to replace the local mixture of N.R. and *Banilla* cottons in Khandesh. Wilt-breeding work was originally included in the Broach and Jalgaon Cotton Breeding Schemes, but, in August 1936, it was decided that the wilt work should be treated as a separate scheme from the 1st April, 1937. In July 1941, the wilt-breeding scheme was extended upto 31st March 1947. In February 1947, it was again extended for a further period of five years from the 1st April, 1947.

During the year under report comparative district trials of 197-3 and *Jarila* were arranged in 24 places under varying conditions of soil. The results when analysed statistically confirmed the superiority of 197-3 over *Jarila* in yield of *kapas* and lint per acre, ginning percentage and staple length. The strain has been valued on an average at Rs. 64 on *Jarila* per *khandi* (784 lbs. lint.) The new variety has been adjudged suitable for 19-21's highest standard warp counts i.e., about 2 to 3 counts lower than *Jarila*.

Only one mill test on the bulk sample of *Jari'a* and 197-3 could be arranged this year. The results are not comparable as strain 197-3 and *Jarila* happened to be grown on plots with a wide fertility difference.

The mortality due to wilt was less than one per cent in both 197-3 and *Jarila*. The strain possesses white flowers as against the yellow flowers of *Jarila* and thus possesses a very useful distinguishing mark. Size of petal is also bigger than that of any white flowered *roseum* variety.

The following crosses are being pursued with a view to pick out segregates showing better performance than 197-3, either in one or more of its agricultural and fibre attributes :—

Cross IV [(*Jarila* x N. R. 5) x *Jarila*] BC. 5 :—

Cross VIII [(*Jarila* x N. R. 5) x *Jarila*] BC. 1.

(New Back cross). Five best progenies were tried in replications on Jalgaon Farm. Out of these Nos. 29-7-4, 29-7-5 and 29-7-6 showed superiority

over Jarila in yield, ginning percentage and staple length. They will be tested further. Besides these, 13 out of the 71 plant-to-row cultures were selected for further observations.

Four new crosses were made this year with 197-3 as their basis and are meant for improving further its ginning, yield, fineness of fibre and wilt-resistance.

Secondary selections in Jarila :—

After the examination of about 2000 plants in the field and of 500 plants in the laboratory, 108 plants were finally chosen for next year's study.

The Committee at its meeting in November 1947 sanctioned a new scheme for cotton breeding in Khandesh for a period of 5 years from the 1st April, 1948. This new scheme has now replaced the Jalgaon Cotton Breeding Scheme.

(c) **Scheme for breeding wilt-resistant cottons in Surat area.**—This scheme was sanctioned by the Committee in August 1936 and commenced work in April 1937. The object of the scheme is to obtain a strain of cotton completely resistant to wilt and suited to the natural conditions obtaining in the Surat tract. This is sought to be achieved either by selection in 1027 A.L.F. or by crossing this cotton with B.D.8 or other wilt-resistant strains.

During the year under report cultures from the following three crosses were tested in wilt-sick plot at Shera :—

(1) [(8-1 x K. F.) x 8-1] x 8-1 F5

Material of this cross is found to be completely resistant to wilt under field conditions. It also combines earliness, good yield, good staple length and fairly good ginning percentage. The feel of the staple, however, is coarse and not up to the standard usually associated with Surat Cotton.

(2) (8-1 x B. C. 1-6) F9

Of the three cultures of this cross *viz.*, 2266-1-4-2, 2266-1-4-3 and 2231-6, the first two are similar in respect of ginning outturn, staple length and resistance to wilt under field conditions. These three characters are fairly good in both, but the first one is coarse in staple feel. Culture 2231-6 is characterised by very high ginning percentage and better staple feel. This culture, is, however, late and is shorter in staple length.

(3) (1027 A. L. F. x B.C. 1-6)F9

Culture 3652-22-2-11 of this cross seems to be promising as it combines high ginning percentage, good staple length and feel combined with high degree of wilt-resistance. Further selection for higher resistance to wilt is in progress. The culture has been crossed again with 1027 A. L. F. for further improvement in staple length.

(d) **Scheme for improvement of Wagad cotton at Viramgam, Jagudan and Bavla.**—While examining the possibility of growing medium and long staple cottons in the short staple areas of India, the Committee, in August 1935, decided that, in view of the absence of any serious attempt to improve the cotton of the large *Dholleras* tract, a comparative study of Indian and Iranian *herbaceum* cottons should be undertaken, with the object of finding out one or more suitable types for the tract. A special officer was deputed to Iran to collect *herbaceum* types of cotton grown there and, in August 1936, a five-year scheme was sanctioned for the improvement of *Wagad* and *Mathio* cottons, the work on *Wagad* cottons being centred at Viramgam and that on *Mathio* at Amreli. The object of this scheme is the improvement of *Wagad* cotton for (a) quality and yield and (b) earliness in order to escape frost. These improvements are sought to be achieved by (a) selection in *Wagad* cotton, (b) hybridization with Surti-Broach quality cottons like 1027 A.L.F. and B.D.8 and (c) hybridization with Iranian *herbaceums* known to be early and of better quality.

The whole of the *Wagad* area is divided into two main tracts (i) the Viramgam tract, characterised by low rainfall and (ii) the Dholka tract with greater and more regular rainfall. The main breeding station is situated at Viramgam and simultaneously a small area is being maintained under irrigation at Jagudan to safeguard the work at Viramgam. In July 1941, it was decided to establish another sub-station at Dholka for conducting botanical work on the promising material obtained from Viramgam.

During the year under review, K. 72-2 (Kalyan) was tested against Wagotar and Local Wagad at Viramgam, Bavla and Jagudan. The results showed that on the whole K. 72-2 maintained its usual superiority over Wagotar and Local Wagad in respect of yield, ginning percentage and spinning quality.

Out of 15 quality types tried at Viramgam, Bavla and Jagudan, 4 were retained for further study in view of their promising performance. In addition, several F1 and F2 progenies of crosses made with the object of combining early maturity with other economic characters, were under observation and the desirable ones amongst them were selected for further study.

K. 72-2 was in good demand in the market during the year under report and the maximum premium realised was Re. 1 per 40 lbs. of *kalas* (dry bolls) and Rs. 5 per 40 lbs. of lint over the local crop.

The average acre cash value of the *kapas* of K. 72-2 was estimated at Rs. 172 against Rs. 139 of Wagotar and Rs. 140 of Local Wagad.

(e) **Scheme for Improvement of Dharwar-American Cotton.**—This scheme was sanctioned by the Committee in July 1941 for a period of five years, and the work was commenced in April 1942. It was extended in February 1947 for a further period of five years. The object of the scheme is to improve the Dharwar-American cotton crop grown in the Kannada districts of the Bombay Province, the adjoining areas of the Madras Province and in Hyderabad and Mysore States. This object is sought to be achieved by the development, (by selection or hybridisation) of an early maturing type, superior to Gadag 1 in respect of yield, staple length and ginning percentage, and which is, at the same time, more resistant to 'red-leaf' blight. The work is being done at Gadag, where conditions of soil, climate, rainfall, etc., are suited to the cultivation of *hirsutum* cotton.

The standard improved variety Gadag-1 isolated from acclimatised Dharwar-American variety is superior to the latter in several respects. To enhance ginning outturn, and resistance to red-leaf blight of Gadag-1, it was crossed with Co2. Out of the several families isolated from this cross, seg. 9-3 was found to combine all the requisite field and trade characters. During the last six years, 9-3 was compared with Gadag-1, both on the breeder's plot at Gadag and on the cultivators' fields, where it showed consistent superiority over Gadag-1 in *Kapas* yield by 26.9%, in ginning outturn by 3.3%, and in resistance to red-leaf-blight by 85.6%. The staple length and spinning value of 9-3 are respectively 0.93" inch and 42 counts against 0.85" in fibre length and 32 counts of Gadag-1. Comparative mill tests of both these varieties have been arranged for.

For further improvement of 9-3, this strain has been crossed with Co2 Co3, Co4, 44113, Perso-American, M-4, Kampala, Jinjiya, 4F-98, Sind-Sudhar, L. S. S., and Parabhani-American.

Effects of manures on yield and incidence of 'red-leaf-blight' were also studied.

EAST PUNJAB.

(a) Scheme for improvement of cotton of south-eastern districts of the Punjab.—

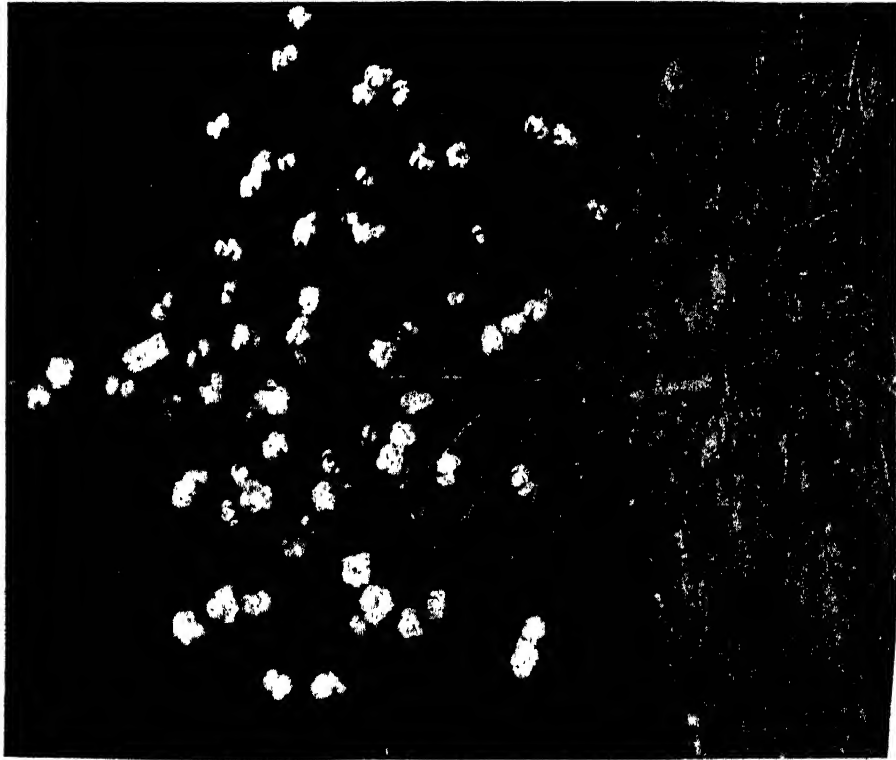
This scheme is an offshoot of the Punjab Botanical Scheme . It was sanctioned by the Committee in July 1944, for a period of five years. At its meeting in January 1945, the Committee, however, reduced the sanctioned period of the scheme from five to two years, as it decided to review the position at the end of 18 months in regard to the extent of the elimination of *desi* cotton in the Canal Colonies. The scheme came into operation at Hansi on the 1st March, 1945. In August 1946, an extension of the scheme was sanctioned for a period of 3 years from the 1st March, 1947.

The object of the scheme is to replace the area under *desi* cotton by high quality American cottons in the irrigated portions of the tract without, however, losing sight of the desirability of breeding improved *desi* types which will continue to be grown in certain parts of the districts in question.

The work so far carried out on *desi* and American cottons has yielded two improved strains (one of each type) which have, in the extensive trials carried out, proved superior to the existing local varieties. The improved *desi* strain, 231R, gave an average yield of 13.9 maunds of *kapas* and a ginning outturn of 41.7% against 11.98 maunds per acre and 38.3% ginning, respectively of the standard Mollisoni strain, M 60 A2. The new American improved strain, "Hariana," which has passed the experimental stage and has been approved departmentally for distribution in the tract, was tested again on the cultivators' fields. It was found to give a mean yield of 14.08 maunds *kapas* per acre against 12.09 maunds of the *desi* variety M. 60A2 It has a staple of 0.92" and a ginning percentage of 32.8, and it is capable of spinning 34's standard warp counts against 6's of Mollisoni.

During the year under review, 535 maunds of seed of "Hariana" were distributed in the districts of Hissar, Rohtak, Gurgaon and Karnal, to cover an area of approximately, 2,000 acres during 1948-49.

Improved varieties of East Punjab Cotton.



Plant of Punjab-American 216F. (Haryana).



Plant of L. S. S.

M. 60A2

216F

Staple of Punjab-American 216F compared with that of the improved *Desi*
(indigenous) strain, M 60A2.

It is reported that two more American strains, AC 101 and AC 102, which are even more promising than "Haryana" have been produced. These will be further studied in the coming season.

CENTRAL PROVINCES AND BERAR.

Central Provinces and Berar Cotton Breeding Scheme.—The Central Provinces and Berar Cotton Breeding Scheme was sanctioned by the Committee for a period of five years with effect from the 1st April, 1939, in replacement of the Central Provinces Botanical Scheme which terminated on the 31st March, 1939. It was extended for three years from the 1st April, 1944 and for six months more from 1st April 1947. It was again extended for six months from 1st October 1947. The object of this scheme is to evolve, by selection or hybridisation, suitable new strains of cotton which can compete successfully with the local Oomras in point of ginning outturn and yield and which, at the same time, possess a staple capable of spinning between 20s and 25s standard warp counts. The scheme is worked at Nagpur and at Akola, to suit the special requirements of the Central Provinces and Berar respectively. Breeding of high ginning strains of Buri cotton for the Burhanpur *tahsil* also forms part of this scheme.

During the year under review, the season on the whole was unfavourable to the cotton crop. The average outturn per acre was over 300 lbs. of *kapas* against 329 lbs. in the previous year. The area covered by V. 434 was 3,06,998 acres against 325,775 in the previous season and that by Jarila, 1,333,729 acres against 1,427,762 last year. ,

In the field tests of promising *desi* strains against V. 434 and local Jadi, the superiority of M. 5A, H. 420, 91, B.40 and No. 99 over the controls in respect of yield was recorded. M. 5A is said to be the best quality strain, being adjudged suitable for 34's standard Warp counts against 28's of V. 434 and 32's of *Jarila*.

A comparison of the results of trials of H. 420 against V. 434, Jarila and Local Jadi conducted in Nagpur, Nimar, Wardha and Chhindwara districts during the past four years showed that H. 420 was the highest yielding strain in Nagpur and Nimar districts, though in Wardha and Chhindwara it stood second. As regards monetary return, H. 420 gave the highest cash value per acre in all districts except Chhindwara. It is stated that there is a great demand for its seed from various parts of the province, particularly from

Nimar district, where it is reported to have been grown on an area of about 43,200 acres in the season under review. In the trials in Berar, H.420 gave the highest cash value per acre in Amraoti and Buldana districts, while in Akola and Yeotmal districts, Jarila was found to give the maximum cash value per acre.

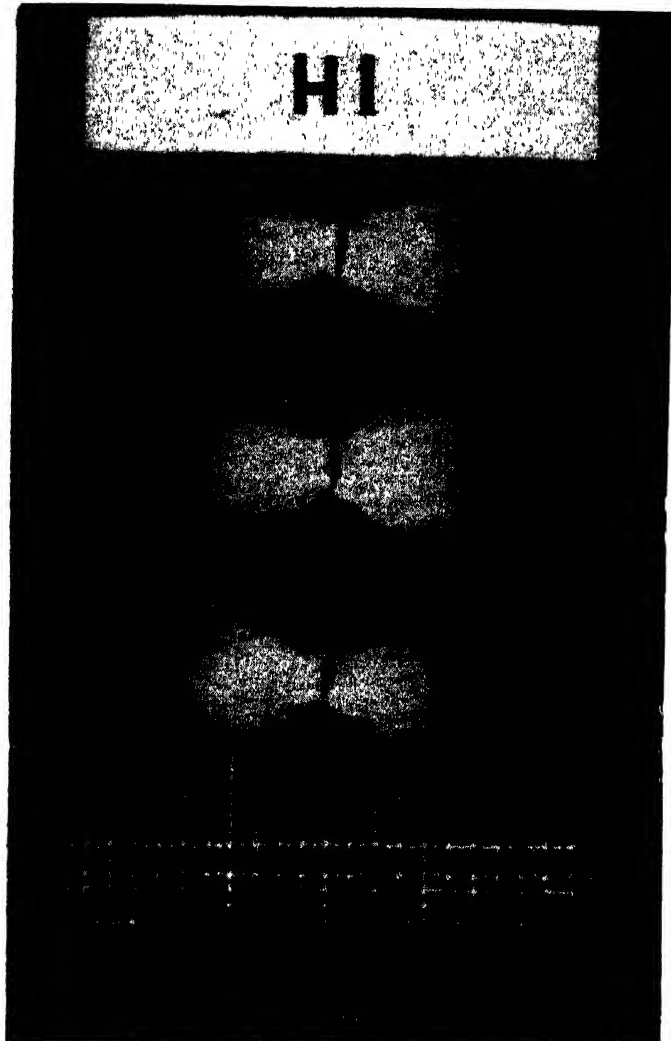
Buri 107, which is grown on a large scale in Burhanpur *tahsil*, has spread to certain parts of Berar, particularly in Amraoti district. It was grown on 25 acres on the Akola farm and its yield averaged 437 lbs. per acre against 248 lbs. in the previous year. As a result of further selection, 3 improved strains, viz., 0394, 0396 and 0382, showing a definite improvement over Buri 107, have been evolved. Of these three strains, 0394 has proved to be the best both in respect of yield and ginning percentage.

MADRAS.

(a) Scheme for Improvement of Mungari Cotton in Madras Province.—

This scheme was sanctioned by the Committee in 1937 and has for its object the evolution of strains suitable to the red soils and combining the quality of the Westerns with the yield of Mungari, to replace the inferior Mungari, the existence of which affords opportunities for mixing, with the result that the better cottons of the tract fail to get their proper value. On the black soils of Anantapur, Bellary and Kurnool districts of the Madras Province, cottons commercially known as Westerns and Northernns are grown. These are medium staple varieties, capable of spinning 24s to 32s' counts. The type of cotton grown on the red and mixed soils, on the other hand, is that known by the name of Mungari, which is a coarse, short staple variety, similar to Bengals, and not fit to spin more than 8s or 10s. The co-existence of varieties of widely different values favours undesirable mixing, with the result that the better cottons suffer in price. It is to overcome this difficulty that the Mungari scheme was started. In January 1942 the scheme was extended for five years from the 24th May 1942 and in February 1947, for a further period of three years.

During the year under review, the new strain 881F was tested in three taluqs—Adoni, Hadagalli and Nandyal—in the cultivators' fields. The results showed that this strain gave on an average about 300 lbs. of seed-cotton per acre and that the lint fetched a price equal to that of the Farm Westerns. The strain is adjudged suitable for spinning 30's Standard Warp Counts against 10's of the local Mungari. The demand for its seed is reported to be great.



Improved strain of *Herbaceum* cotton from Madras.

The trials with 14 selected American varieties showed the superiority of five of them in respect of yield over the local and 881F against which they were compared. In another experiment with early types, one culture, 3920 was found to be the best biotype combining all the desirable characters and excelling the mean values of 881F as regards staple length and early maturity.

Owing to very low incidence of stenosis during the year, the comparative resistance of the promising selections in the progeny rows to this malady could not be assessed. Fresh crosses to combine yield with earliness, medium staple, and high ginning outturn were effected.

(b) Scheme for Improvement of Cocanadas cotton in Madras Province.— This scheme was sanctioned by the Committee in November 1938, for a period of five years. The work was started from 1st February 1940. The object of the scheme is to improve the yield and ginning percentage of Cocanadas cotton, preserving at the same time the light pinkish colour of its lint owing to which it is in great demand for the manufacture of dyed yarns. In July 1944, an interim extension of 6 months from 1st February, 1945, was sanctioned and in January 1945, a further extension of 4½ years from 1st August 1945 was sanctioned.

Studies on the variability of economic characters revealed that (a) plant habit characters were affected by changes in environment (b) lint colour was modified by a change in locality of growth (c) conjoint variability for all characters was absent in all bulk collections (d) there was wide scope for the selection of plants with single attributes like staple, ginning percentage or colour (3) plants with deep coloured lint had always a shorter lint length and coarser fibre (f) Godavari district was likely to be a secondary centre of origin for 'Cocanadas' as judged from the variability and isolation of six new botanical types and (g) heritable variability for colour was abundant in Godavari district but from the point of view of other attributes, Guntur district possessed the largest useful variation and (h) preliminary survey and analysis of the white cotton variety in the Vizagapatam district showed that the yellow-flowered *Buradapathi* had longer staple than the white flowered type.

Lint colour was affected by changes in environment. Heavy dew or rains at harvest stage followed by bright and hot weather, intensified the colour. Dry hot periods, cloudy days with low temperatures and harvests of unripe bolls contributed to colour dilution. Detailed study of the fibre properties disclosed a very strong association between depth of colour, short-

ness of staple and coarseness of fibre. In view of these findings, the requirements of the trade and mills were ascertained. The consensus of the opinion was in favour of a biotype having the colour grade of the variety now in cultivation with improvements in strength and cleanliness.

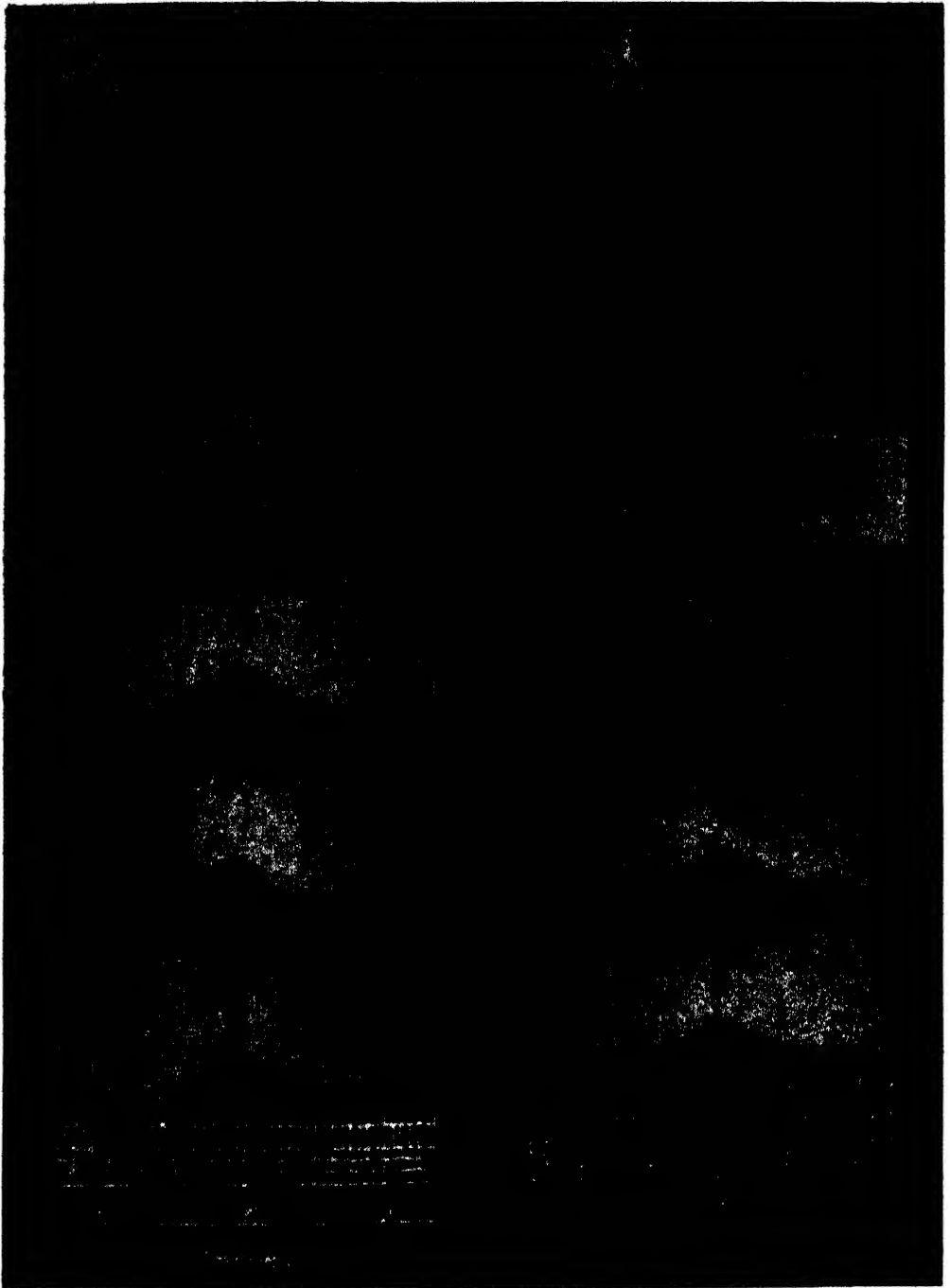
Interstrain crosses were effected for the synthesis of colour-staple combinations beyond the limits noticed in natural populations but so far the mean staple length of the best biotype isolated by this method has not exceeded that of the best pure line. They, however, contributed to the increase of productivity and ginning. Interforma hybridisation was, therefore, taken up as the next promising line of attack and crosses between *indica* strains possessing staple, fineness and adaptability on the one side and *burmanica* varieties having staple colour genes, were made and studied. Reselection in Manipur khaki yielded biotypes possessing colour grade over 3 and staple of 23 mm. and this is being used as a parent in later crosses. Three varieties in the collection *viz.*, Manipur Khaki, Nanking Khaki and G. 1019 have been employed as parents and the work is in the early stages.

The 'Chinnapathi' zone characterised by early season and inferior quality like *mungari* in Ceded Districts did not possess any variability for applying selection. Conversion into a medium staple white cotton area of replacement by a coloured variety were the two alternative possibilities for this tract. G. I. was unsuitable on account of its late habit. Hybridisation with early types has been commenced to evolve the desired biotype. Jarila and 881F from the white linted group were as good as Chinnapathi in yield and far superior in quality. There was no outstanding type from the coloured group and as such fresh crosses were programmed and partly carried out.

G. 1 is a strain evolved at Guntur through interstrain hybridisation. It possesses all qualities except the desired colour shade. The opinions elicited through technological tests, trade valuations and consuming mills were generally in its favour in spite of its lighter shade. Trials on cultivators' lands indicated that it could be distributed in zones where the quality of cotton now produced was inferior in staple and variable in colour. The whole of the Nellore district, Red Northern area of Kurnool district and eastern talukas of Guntur District would fall under this category.

(c) **Scheme for breeding Cambodia cotton in ceded districts in Madras Province.**—This scheme was sanctioned by the Committee in July 1944, spread over a period of five years.

Staples of Improved Cambodia (American) Strains from Madras.



Co. 4. B 40 is not only the latest improved strain but also is the longest stapled.

The co-existence of several varieties differing in quality, the paucity of variation in the indigenous mixed *desi* material resulting in no progress being made in the improvement of the 'Northerns' and 'Westerns' cottons and the prospect of bringing a million acres or more under the Tungabhadra irrigation project are the main reasons for undertaking this scheme. The objects of the scheme are (1) to evolve a long staple American variety capable of giving good yields when grown as an irrigated *rabi* crop, and (2) to breed an exotic type suitable for cultivation in the unirrigated regions not served by the Tungabhadra project.

The work is conducted at three centres—Siruguppa, Hagari and Nandyal representing three distinct regions, *viz.*, (1) irrigated black soil, (2) unirrigated black soil, subject to variable rainfall, and (3) unirrigated black soil, characterised by heavy rainfall and early season.

During the year under review, the yield of the experimental crop was low. The drought caused by scanty rainfall and the breakdown of the pumping engine were deemed responsible for this. In the trials conducted at Siruguppa under irrigation, nine of the best selections of the previous season together with seven varieties from Nanded and seven types from Lyallpur, were tested against H. A. 11, the control variety. M. A. II was the only type which was significantly superior to H. A. 11 in respect of yield of seed cotton and lint. Seven more types gave yields of seed cotton equal to the control. A review of the results obtained during the past several years showed that M. A. II is the most consistent type that has maintained its first rank in respect of yield, earliness and jassid resistance. Nevertheless a preliminary examination of the different economic characters revealed that further improvement of this variety through re-selection was not possible. Accordingly M. A. II along with other desirable types was extensively used for crossing with selected bio-types possessing the desired characters. Of the various crosses tested, those involving M.A. II and G. 1 x Co. 2-5 were found to be promising; they combine higher ginning and greater lint length than those of the parental types. In the trials under rainfed conditions carried out at Nandyal and Hagari, four varieties, M.A. II, D.A. 2-6-5/3, H.A. II and 11-43-8380 have been found to be equal to the control in regard to yield of seed cotton.

UNITED PROVINCES.

Scheme for hybridisation in arboreum cottons.—This scheme was sanctioned in July 1943 and it came into operation on the 1st April, 1944.

The object of the scheme is to evolve strains of *desi* cotton, primarily for the rainfed areas of the Province, which, while possessing the earliness, hardness, yield and ginning qualities of C.520 would be capable of spinning higher counts than the latter. This is proposed to be achieved by crossing some of the promising strains obtained under the United Provinces Botanical Scheme with superior quality cottons, such as *Jarila*, Verums, Indicums (*Banis* and *Gaoranis*), Shans and Million Dollars.

During the year under review, work on *desi* cottons was carried out at the Bulandshahr and Raya Experiment Stations and the hybrid material available in the different stages of F1 to F4 and F6 to F9 of the crosses of C.402, C.520 and survey selections with better varieties such as *Jarila*, Verum, Bani and *Gaorani* were studied. 19 progenies gave significantly higher yield than C.520 (control) and were found superior in one or other economic characters.

The work on American cottons has for its object the evolution, by hybridisation or selection, of strains superior to Perso-American in yield and quality. Several successful crosses were made, using Perso-American, Punjab-American, Parbhani-American, Iran-American and 104F as parents and selections superior to the parents in one or more economic characters have been obtained.

ASSAM.

Scheme for improvement of hill cotton in Assam.—This scheme was sanctioned by the Committee in January 1944 for a period of five years and it came into operation in February 1947.

The scheme has for its object the production of high yielding types of coarse short staple cotton with high ginning percentage.

During the year under review, the material tested at Jorhat Experimental Farm consisted of selections made previously from all the cotton growing tracts of Assam. The types under study included 32 from the Garo Hills, 7 from the Naga Hills, 16 from the Mikir Hills, 11 from Comilla, 11 from the Mismi Hills, 9 from the Chittagong Hills, 3 from the Lushai Hills, 15 from the Haflong Hills and 38 of long and medium staple Upland cotton. Selfing was carried out for the maintenance of the purity of the types but owing to the departure of the Botanical Assistant for training, the material could not be studied in detail. The *hirsutum* types are reported to have fared very badly; some of them were not able to stand the weather conditions, and others

were affected severely by jassids. The insect pests, *Sphenoptera gossypi*, Jassids, *Platyedra gossypiella* and *Dysdercus cingulatus* were found to do some damage.

HYDERABAD STATE.

(a) **Gaorani Cotton Improvement Scheme.**—This scheme, which is an off-shoot of the Hyderabad Botanical Scheme, was sanctioned by the Committee in July 1943, for a period of 5 years from the 1st April, 1944.

The objects of the scheme are :—(1) production of suitable, fine quality wilt-resistant strains of *bani* cotton for the three different zones, viz., North-East, Central and South-West portions of the *Gaorani* protected area, and (2) evolution of a suitable Upland American strain for the highlands of Adilabad. Work in connection with the production of wilt-resistant types of *Gaorani* is being conducted at Parbhani as part of the newly sanctioned scheme for the improvement of Oomras cotton.

The work in connection with this scheme was located at Madhol, Nanded and Latur representing the north eastern, central and south western parts of the *Gaorani* Protected Area. Preliminary work for the production of a suitable upland strain for Adilabad Plateau was carried out at Madhol. In addition, the agronomic experiments with cotton started in 1941-42 were continued.

North eastern Gaorani Protected Area.—The three wilt resistant types tested in the main varietal test viz., P-II-43-159 (*Gaorani* 6), P-II-43-165 (*Gaorani* 6E-3) and II-42-7316 (*Gaorani* 6E-3) from the 1946-47 crop at Parbhani spun to 33's, 35's and 40's highest standard warp counts respectively.

Central Gaorani Protected Area.—Of the two strains II-42-7310 (*Gaorani* 6) and N-II-42-165, which gave a promising performance in the previous years, the former spun to 31's and the latter to 29's. As such these do not compare favourably with *Gaorani* 6. In the varietal test at Nanded, *Gaorani* 6E-3 and *Gaorani* 12F-2, though similar to *Gaorani* 6 in other respects, spun better than it. *Gaorani* 12F-2's performance on cultivators' fields in the past two seasons coupled with the more vigorous habit and somewhat better resistance to wilt makes it a serious competitor to *Gaorani* 6, the variety now under large scale cultivation.

South western Gaorani Protected Area.—*Gaorani* 12F-2 has justified the decision taken by the Indian Central Cotton Committee on the multiplication and distribution of this variety in this area. The higher ginning sub-strains of this variety need further trial.

There is a tendency of the earlier maturing selections from *Gaorani* 4M-II to spin lower than the parent but two cultures from the sub-strain, II-44-1464 are reported to be promising for wilt-resistance under controlled conditions at Poona.

Adilabad plateau.—The work of this tract has not made much progress due to the lack of a proper experimental farm at or near Adilabad.

Production of selfed seed of *Gaorani* 6, *Gaorani* 6-E-3 and *Gaorani* 12F-2 to form the nucleus of large scale multiplication of these varieties was continued. The area covered by the improved varieties (Departmental seed) during the year under report was as follows :—

Variety.	Area covered (Acres).	Tract in which the crop was grown.
<i>Gaorani</i> 6 ..	2,56,000	Nanded district.
<i>Gaorani</i> 6E-3 ..	15,732	Wadi Buzurg and villages surrounding it in Nanded district.
<i>Gaorani</i> 12F-2	10,500	Latur, Kallam and Ahmedpur taluqas of Osmanabad district.

(b) **Scheme for Improvement of Cotton in Parbhani district.**—This Scheme, which is an off-shoot of the Scheme for improvement of cotton of Oomras tract in Hyderabad State, was sanctioned by the Committee in February, 1947 for a period of five years. The scheme started functioning from the 1st April, 1947.

The objects of the scheme are :—

- (1) the production of a high ginning and high wilt-resistant strain of G. 12F-2 suitable for the entire district of Parbhani, if possible,

the production of similar other strains from basic material other than G. 12F-2,

- (3) the maintenance of the improved strains of American cotton bred for the *ghat* area of Aurangabad district,
- (4) the study of wilt-resistance in field conditions at Parbhani and under optimum conditions of temperature and infection at Poona,
- (5) the carrying out of district trials of the improved strains against the local variety.

The following is a summary of the work done during the year under review :

- (a) Efforts to produce a higher ginning and wilt-resistant strain of *Gaorani* 12F-2 resulted in the production of nine strains ; of these, three strains, *viz.*, II-43-35, II-44-1231 and II-44-1290 were under trial in cultivators' fields.

Further one sib of *Gaorani* 6 (II-43-159) and two of *Gaorani* 6E-3 (II-42-7316 and II-43-165) gave promising results and deserve further trial.

- (b) Five other strains obtained from basic material proved to be higher ginning than *Gaorani* 12F-2 and fairly resistant to wilt. All of these are suited to the southern part of Aurangabad and Bhir districts.
- (c) Eleven cultures derived from a progeny of *Gaorani* 16C (II-41-6838) were found 100 per cent wilt-resistant at Poona under optimum conditions of wilt-infection, temperature and humidity. Of these, two cultures possess desirable fibre characters and ginning percentage.
- (d) In the district trials, *Gaorani* 12F-2 maintained its superiority in yield and spinning quality. The performance of its higher ginning sibs (II-43-35, II-44-1231 and II-44-1290) needs to be studied further
- (e) In the heavy soils of the *ghat* area of Aurangabad district, all the improved American varieties except II-43-8380 yielded better than the local American crop. The improved varieties are all earlier maturing and higher ginning than Parbhani American 1.

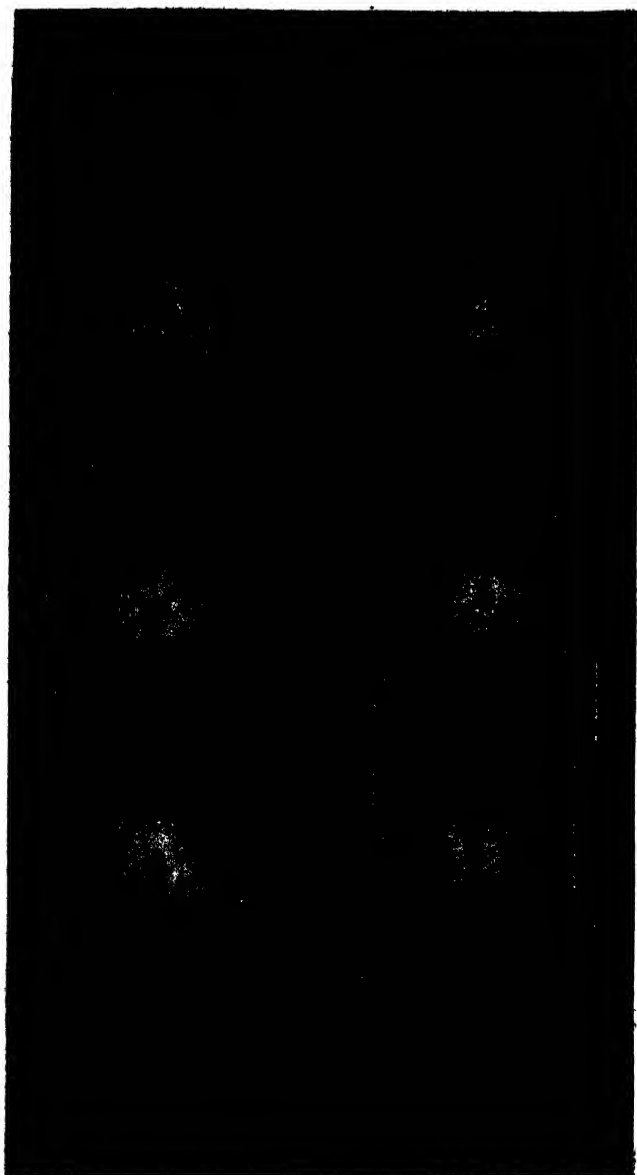
(b) **Scheme for improvement of Kumpta cotton.**—This scheme was sanctioned for a period of five years and it came into operation in November 1937. The object of the scheme is to develop certain strains of Kumpta cotton bred from the local variety of Raichur which, in the preliminary tests conducted at the Government Experimental Farm, Raichur, prior to the starting of the scheme, had given better yields of both seed-cotton and lint than either the local variety or improved *Jayawant*. After two years' work, the strain Raichur-Kumpta 15 was selected for further development. It was sown in 1939-40 on an area of about 40 acres in a cultivator's field, and an average yield of 293 lbs. of seed cotton per acre was obtained. Though this yield was a good deal better than the average of the local variety in the adjoining fields, the Committee, at its meeting held in August 1940, suggested that this strain should not be distributed on account of its susceptibility to wilt, and that strain R. K. 19 should be tested instead and attempts made at once to produce a wilt-resistant Kumpta type. In January 1942, the Scheme was extended for five years from 28th November 1942. At its meeting in January, 1944, the Committee approved of the release of Raichur Kumpta strain 19 for large-scale cultivation. During 1945-46 this strain was cultivated over an area of 800 acres, and in 1947-48 on 3,000 acres.

In the year under review, seed of six improved strains which were more resistant to wilt in the field than Raichur Kumpta 19 was sent to Poona for trial, but none of them was found promising. As a result of hybridisation, fourteen segregates with fair wilt-resistance in the field have been produced. Of the several back crosses sent to the Plant Pathologist, Poona, for testing under optimum conditions of temperature, humidity and wilt infection, twenty three cultures are reported to be very promising.

Production of selfed seed was continued as part of the work of seed multiplication and distribution of Raichur Kumpta 19 financed by the Hyderabad Government.

BARODA STATE.

Scheme for improvement of Mathio cotton at Amreli.—This scheme has for its object the improvement of *Mathio* mixture in respect of yield, ginning percentage and quality and the trial at Amreli of the early strains of *Wagad* evolved at Viramgam with a view to replacing, if possible, inferior *Mathio* by early *herbaceums*. The scheme came into operation in June, 1937. In January 1942, it was extended for five years from 1st June 1942, and in August 1946, for a further period of 5 years from 1st June, 1947.



Two Improved strains of Mysore American Cotton.

During the year under review, thirty-four progenies of C. 520 x Pratap and its back-crosses were studied in 4 replications. Four promising progenies were selected for further trials. Out of 10 Fs of Pratap x Coimbatore *arboreums* studied in six replications, 4 Fs were found desirable for economic characters. The back-crosses made with these 4 Fs are, therefore, retained for further work. Fresh exploration of *Mathio* mixture was done during the year. It was observed that anything superior to Pratap was a rarity. Fifteen plants (11 for long staple and 4 for high ginning percentage) were selected from this collection for further work.

MYSORE STATE.

Scheme for breeding Sea Island and Egyptian cottons in Mysore.—This scheme, which is an off-shoot of the Mysore (Doddahathi) cotton scheme, was sanctioned by the Committee in January, 1944, for a period of three years from 1st November, 1944, and was extended from 1st November, 1947, in February 1947 for a further period of three years.

It is concerned with (1) the acclimatisation and breeding of Egyptian and Sea Island cottons, and (2) the testing, in large-scale trials, of Mysore-American strains evolved under the Doddahathi scheme.

It is reported that during the year under review, the superiority as regards yield of seed cotton of M. A. V over other American strains including Co.4 was once again confirmed. The sowings done in October, November and December at the Irwin Canal Farm proved more suitable, both from the point of yield and plant growth, than plantings in other months. Giza 12 gave the highest yield in all the sowings and Maarad, which has now been acclimatised, came next. At the Babbur farm, it is stated, no conclusive results regarding the optimum period of sowing have so far been obtained, though there was an indication that June-July sowings were generally good. In the June sowings, Giza 12 is reported to have excelled Giza 7 this year.

In another similar trial, the Sea Island type, S. I. V. 135 was found to respond better to October—November plantings than to September sowings, in which a high mortality of plants was recorded.

It is stated that out of the 40 selections from S. I. V. 135 tested in progeny rows, the twenty three which gave higher yield than the control and possessed long lint and good ginning, were retained for further study.

STUDIES OF PESTS AND DISEASES.

Scheme for investigation of 'small leaf' disease of cotton.—This scheme is an off-shoot of the Mungari Cotton Breeding Scheme. It was sanctioned by the Committee in January 1942, for a period of three years and came into operation on the 1st June, 1943. It was extended in August 1946 for a further period of two years. The extension scheme was put into operation with effect from the 1st September, 1946, and it terminated on the 31st August, 1948. The object of the scheme was to investigate the causes of "small leaf" disease of cotton, and to determine whether or not the disease is of virus origin. The work was carried out at Poona.

During the year under review, experiments on transmission of the virus of "Small Leaf" disease to healthy plants of cotton were carried out at the Government Main Farm, Raichur, through the agency of the undermentioned sucking insects :—

White fly	..	..	1) <i>Bemisia tabaci</i>
Aphids	..	..	2) <i>Aphis gossypii</i>
			3) <i>Myzus persicae</i>
Jassids	..	..	4) <i>Empoasca devastans</i>
			5) <i>Empoasca</i> Sp.
			6) <i>Eutettix</i> Sp.
Scale insects..	..	..	7) <i>Pseudococcus</i> sp.
			8) An unidentified <i>membracid</i>

It is stated that 79 plants were inoculated during October, 1947, by the different species of insects mentioned and all the plants were kept under observation till February, 1948. In a few plants inoculated with jassids, smalling of the leaves was noticed in December, but in no case, pronounced symptoms of "Small Leaf" were noticed.

Co-ordinated crop weather scheme.—This scheme was sanctioned by the Committee in August 1946 for a period of 5 years and it came into operation in September, 1947. The object of the scheme is to study the effect of climatic factors on plant growth, crop yield and the incidence of pests and diseases over a series of years at selected experimental farms according to a

common plan. The farms selected for the purpose of this scheme are located at the following stations :—

- | | | |
|-------------|--------------|---------------------------|
| 1. Kanpur, | 5. Viramgam, | 9. Coimbatore, |
| 2. Dharwar, | 6. Nagpur, | 10. Koilpatti, |
| 3. Surat, | 7. Amraoti, | 11. Parbhani (Hyderabad), |
| 4. Jalgaon, | 8. Akola, | 12. Indore, |
| | | 13. Baroda. |

The technical programme of the preparatory stage of the scheme in respect of cotton is on the same lines as that for the corresponding schemes sanctioned by the Indian Council of Agricultural Research and the Indian Central Sugarcane Committee. During the preparatory period which is expected to last until March 1949, the initial work relating to the training of the headquarters staff and the observers at out-stations, setting up of the meteorological observatories and the laying out of the crop experiments at these stations, preparation and distribution of technical circulars and standard forms, etc., is to be carried out. Thereafter, all the co-operating stations are expected to start recording the crop and weather data according to the scheme and sending them for analysis to Poona.

The headquarters staff consists of one Assistant Meteorologist, one Assistant and four Computers. Their training in the details of the work and in statistical analysis is being completed shortly.

CHAPTER V.

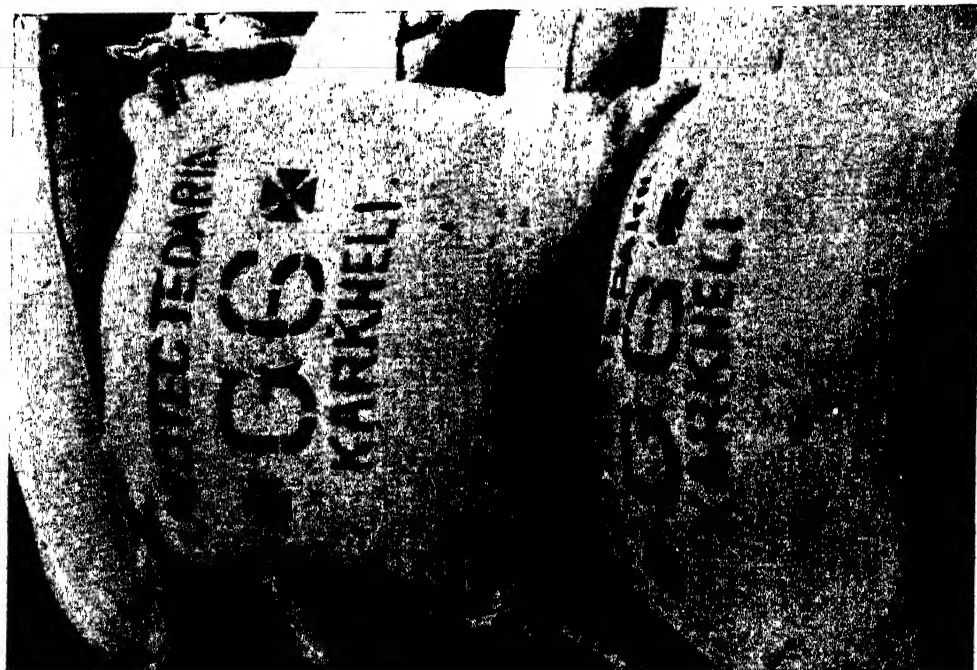
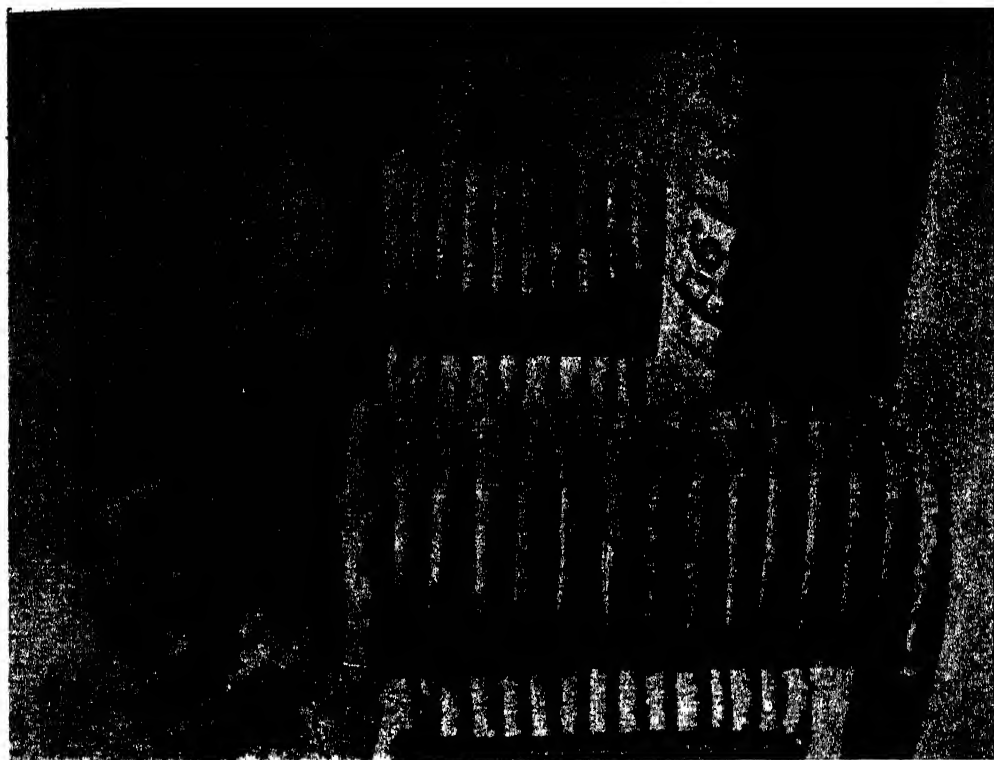
EXTENSION WORK IN THE PROVINCES AND STATES.

The Seed Distribution and Extension Schemes of the Committee form the real link between the experimental station and the cultivator and in recent years increasing attention has been paid to the development of the extension work with the object of getting the grower to adopt the various improved practices and improved seed evolved as a result of the research schemes of the Committee. The total amount so far spent by the Committee on such schemes amounts to some Rs. 23½ lakhs. During the period under review, there were 13 seed distribution and extension schemes in operation in the various cotton growing Provinces and States. A brief report on the working of these schemes is given below :—

BOMBAY.

(a) **Jarila Seed Distribution and Extension Scheme.**—This scheme was sanctioned in March 1937, for a period of ten months in the first instance. It was extended in January 1938, for a period of one year, in November 1938, for three years and again in July 1941, for a further period of five years. In February 1947 the Committee sanctioned a further extension of two years from the 1st March, 1947. Its original object was to replace *Banilla* in the Khandesh tract with *Jarila*, which is wilt-resistant, over an area of some 155,000 acres. In view, however, of the general suitability of *Jarila* for the Khandesh area, the expansion now aimed at is 8,00,000 acres, out of a total cotton area of 1,100,000. The scheme was operated in five stages of which the first two were the Government Farms at Jalgaon and Bhadgaon. The seed produced at the Jalgaon Farm was used for further multiplication in the wilt-affected regions, and that at Bhadgaon Farm for the wilt-free zone of Khandesh. In January 1943, the Committee approved of the proposal to close down the seed farm at Bhadgaon and to transfer the seed multiplication work being done there to the Jalgaon Farm and the Mamurabad village adjoining it.

Stages I and II.—The selfed seed from the previous year was sown on an area of 23.6 acres on the farm and 4,920 lbs. of seed were obtained for multiplication in stage II. The seed of stage II produced from 98.7 acres was 20,232 lbs. The produce of both stages was ginned in the Farm Gin and the



lint, which was sold by auction at Jalgaon, fetched Rs. 265/8 per *boja*, i.e., Rs. 601 per *candy* f.o.r. Bombay, against Bombay Jarila quotation of Rs. 509 per *candy* on the same day.

Stages III and IV.—Of the 10,366,070 lbs. of Jarila seed distributed by the Department and approved stockists, 9,366,760 lbs. of seed were utilised for sowing and the balance 999,310 lbs. was handed over to the Revenue Department for feeding purposes. The controlled area during the year was 221,722 acres (including a reserved area of 89,453.5 acres). This acreage, however, fell short of the stipulated area of 550,000 acres by 328,278 acres and the reduction was attributed to the replacement of cotton by food crops on a part of the area and to adverse seasonal factors. The total area under *Jarila* (including natural spread) was estimated at 229,929 acres against 244,297 acres last year.

It is estimated that the growers realised on an average Rs. 23/10 per Bengal maund of *kapas*. In auction sales, premia ranging from Rs. 30 to Rs. 80 over the prevailing Bombay Jarila quotations are said to have been obtained. The *extra income* realised by the cultivators of Jarila was estimated at Rs. 30,46,559 over an area of 229,929 acres, i.e., Rs. 13/4 per acre.

For sowing in 1948-49, the Agricultural Department and approved stockists purchased and stocked 1,561,690 lbs. of seed.

The Cotton Control Act was applied to the whole of Khandesh tract, making Jarila the prescribed variety for the tract. The Cotton Transport Act has been applied to the tract but in so far only as it relates to movement by rail. The question of its application to transport by road is under consideration. It is reported that with the removal of control on movement of cotton seed, there was a large flow of cotton seed into the Khandesh Protected area from adjoining areas of the Central Provinces and Berar both by rail and road. The transport by rail is said to have been brought under control.

(b) Revised Jayawant and Gadag No. 1 Seed Distribution Scheme.—This scheme, which was sanctioned in August 1935, for a period of five years replaced five seed schemes in the Southern Division of the Bombay Province, viz., the Hubli, Gadag, Athani, Haveri and Bailhongal schemes. It came into operation on the 1st June, 1936; in August 1940, it was extended for a period of one year and again in July 1941, for a further period of four years from 1st June, 1942. In August 1946, it was further extended up to the

31st May, 1948, and again in March 1948 for a further period of one year up to the 31st May, 1949.

The original object of the scheme was to eliminate local mixtures and to extend pure Jayawant and Gadag No. 1 in the Southern Division of the Bombay Province, over an area of $9\frac{1}{2}$ lakhs acres, within a period of five years. During the extension period of the scheme, it was proposed :—

- (1) to cover an additional area of 425,000 acres with Jayawant and 75,000 acres with Gadag No. 1.
- (2) to carry on intensive propaganda for the cultivation of improved cotton and to check the growing of inferior types ;
- (3) to have Jayawant and Gadag No. 1 pressed under departmental supervision and marketed under 'Agmark' ;
- (4) to make seed distribution work self-supporting by gradually reducing the subsidy on cotton distributed ; and
- (5) to entrust the work of the scheme to efficient co-operative organisations provided the working of the scheme was not adversely affected.

The scheme is operated from eleven centres for Jayawant, *viz.*, Dharwar, Hubli, Nargund, Haveri, Bailhongal, Gokak, Athani, Bagalkot, Hungund, Bijapur and Muddebihal, and from two centres for Gadag No. 1, *viz.*, Gadag and Ron. Decentralisation is the key-note of the scheme, the idea being that no single agency should have too big an area to cover or too great a responsibility to shoulder.

During the year under report, the Department of Agriculture organised a reserve area of 94,980 acres of Jayawant and 21,374 acres of Gadag No. 1, of which 94,044 acres and 20,409 acres, respectively, were rogued. Owing to the 'Grow More Food' campaign, fall in price of cotton and the difficulties of sowing due to continuous rains, all the seed stocked could not be distributed. In all 48,459 bags (60,84,260 lbs.) of Jayawant and 12,580 bags (12,85,000 lbs.) of Gadag No. 1 seed were distributed to cover an area of 515,134 acres and 120,690 acres, respectively. The area under natural spread was estimated at 56,882 acres under Jayawant and 50,320 acres under Gadag No. 1, thus bringing the total area under to 572,016 acres and that under Jayawant Gadag No. 1 to 171,010 acres ; the corresponding figures for the previous year being 667,629 acres and 158,477 acres, respectively.

The produce of both the reserved and general areas amounting to 40,708 *docras* of *Jayawant* and 14,356 *docras* of Gadag No. 1 was sold by auction at an average premium of Rs. 18-2 for *Jayawant* and Rs. 27/5 for Gadag No. 1 per *nag* (1,344 lbs.) of *kapas* over the *bazar* rates.

The original programme was to stock 11,025,700 lbs. of *Jayawant* and 1,675,000 lbs. of Gadag No. 1 seed for sowing in 1948-49, but purchases made up to the 30th April, 1948, amounted to 3,334,520 lbs. of *Jayawant* and 930,600 lbs. of Gadag No. 1.

The agmarking was continued on an optional basis and up to the end of April 1948, 873 bales of *Jayawant* were agmarked. It is believed, however, that unless the millowners show their appreciation of agmarking by paying adequate premiums for agmarked bales over the ungraded cotton, agmarking of cotton will not become popular.

(c) **Scheme for cultivation of 1027 A. L. F. cotton in Nawapur Taluka.**— This scheme was sanctioned by the Committee in January 1942, for a period of three years and it came into operation on the 4th May, 1942. In January 1945, it was extended for a period of one year. The Committee was informed at that meeting that the total area under cotton in the taluka had decreased from 25,000 acres in 1942-43 to 18,300 acres in 1943-44 and to 16,000 acres in 1944-45 and that, of this, the area covered with pure seed of 1027 A.L.F. distributed by the Department was 10,000 acres. In February 1946, the scheme was further extended from 4th July, 1946, to 31st March, 1947, and in February 1947, for a further period of 3 years from the 1st April, 1947.

The original object of the scheme was to cover an area of 25,000 acres in Nawapur taluka with 1027 A. L. F. cotton. During the 1st extension period, it was proposed to multiply 1027 A. L. F. cotton in the controlled area so as eventually to cover the whole area with this variety. During the present extension it is also proposed to study the results of the comparative trials with *Suyog* and 1027 A. L. F. with a view to selecting the better of the two for cultivation in Nawapur taluka.

A total quantity of 2,23,397 lbs. of seed was distributed during the year by the approved merchants to cover an area of 10,000 acres, of which 3,730 acres are certified. The seed obtained from this area would be sufficient to cover the whole area of Nawapur taluka.

The results of trials of *Suyog* and 1027 A. L. F. conducted in Nawapur taluka indicated that *Suyog* is better in respect of yield and ginning percentage, but inferior in spinning value to 1027 A.L.F. The question of replacing 1027 A. L. F. by *Suyog* has, therefore, been postponed.

The produce of the 1947-48 crop was pooled and marketed by public auction and an average premium of Rs. 3 per *bhar* (924 lbs.) of seed cotton over the local variety was realised. The average selling rate of seed cotton of Nawapur 1027 A. L. F. is stated to be Rs. 372 against Rs. 405 for Surat *Suyog*.

(d) **Scheme for multiplication and distribution of "Vijaya" cotton in Middle Gujarat.**—This scheme was sanctioned by the Committee in July 1943, for a period of five years and it came into operation on the 1st December, 1943.

The object of the scheme is to completely replace local Broach and B.D.8 cottons by *Vijaya* cotton over an area of 5 lakhs acres in the Nerbudda-Mahi and the Mahi-Sabarmati zones of middle Gujarat.

During the year under review, the Agricultural Department controlled a seed multiplication area of 19,349 acres (including 1,294 acres grown with farm pedigree seed) against an area of 20,009 acres (including 2,074 acres grown with farm pedigree seed) in the previous year. The total estimated area under *Vijaya* during the year was 210,600 acres (out of a total cotton area of 246,700 acres) against an area of 184,750 acres in 1946-47. The total quantity of seed distributed by the Agricultural Department was 151,335 lbs. against 1,144,527 lbs. in the previous year. In addition, the Co-operative Cotton Sale and Seed Supply Societies distributed 856,970 lbs. (against 348,980 lbs. of seed in the previous year) to cotton growers in parts of Broach and Kaira districts. The total quantity of seed thus distributed was 1,008,305 lbs. against 1,493,507 lbs. in the previous year; the reduction is attributed to the damage caused by the abnormal rains in April 1947. In all, 5,322 full pressed bales of pure *Vijaya* were obtained from the controlled area, of which 4,550 were sold at a premium varying from Rs. 145 to Rs. 215 per candy f.o.r. Bombay over the March and May Indian Cotton Contract quotations. At the end of the season, 772 full pressed bales remained on hand. These are reported to have been held back in expectation of higher prices. The marketing of *Vijaya* cotton during the season was quite easy due to its good quality and the rising prices brought about by the scarcity of staple cottons in the Indian Union.

Moreover, the premium obtained by 1027 A. L. F. cotton was not sufficient to compensate for its lower ginning outturn, and consequently *Vijaya* seed cotton from the general area was readily purchased by ginowners at a premium of Rs. 20 to Rs. 30 per *bhar* over 1027 A. L. F. cotton grown in the tract.

(e) **Scheme for multiplication and distribution of Kalyan (K. 72-2) cotton in Ahmedabad district.**—This scheme was sanctioned by the Committee in February 1947 for a period of five years and it came into operation on the 1st April, 1947. The object of the scheme is to replace completely Wagotar cotton by Kalyan variety over an area of 330,000 acres in the Wagad tract of Ahmedabad district, comprising the talukas of Viramgam, parts of Sanad, Dholka, Dhandhuka and Deskroi.

During the year under review, the total available quantity of 36,200 lbs. of Kalyan cotton seed was distributed to cover an area of 1,914 acres against 995 acres programmed for.

Stages II and III were organised at Viramgam over an area of 12½ and 129.4 acres, respectively. The produce of these two stages was purchased and ginned under departmental supervision. The *kalas* (dry bolls with seed cotton) of stages IV and V were purchased by the approved agents.

384,000 lbs. of cotton seed were expected to be produced in the season 1947-48, of which some 348,000 lbs. are proposed to be distributed for sowing over an area of 17,500 acres during the year 1948-49 against 7,945 acres originally programmed for. The remaining 36,000 lbs. of seed would be kept as reserve material for emergent use.

About 750 bales of *Kalyan* cotton were expected to be produced during the season under report and the bales which have been sold to the mills at Ahmedabad up to the date of reporting are stated to have realised a premium of Rs. 30 to Rs. 50 per bale over local *Wagad*. On this basis, the growers of *Kalyan* cotton are said to have realised an extra income of Rs. 16,750.

(f) **Scheme for multiplication and distribution of Suyog cotton in Surat tract (South of river Nerbudda).**—This scheme was sanctioned by the Committee in July 1944 for a period of five years and it came into operation on the 1st April, 1945.

The object of the scheme is to replace 1027 A. L.F. and 1A cottons by *Suyog* over an area of 2 lakhs acres in the Surat tract of Bombay Province, lying South of the river Nerbudda, excluding Nawapur taluka of West Khandesh district.

During the year under report, the Agricultural Department controlled an area of 49,165 acres (against 33,562 acres in the previous year), out of which, the produce of 47,170 acres was certified and agmarked. A total quantity of 1,168,282 lbs. of *Suyog* seed was distributed (against 1,021,181 lbs. in 1946-47) including 12,573 lbs. from the Government Farm at Surat. The number of pressed bales of certified *Suyog* cotton was 14,432 (against 8,809 in the previous year) of which 263 were agmarked with red labels (Pedigree) and 14,169 with black labels (Agmark certified). 14,229 bales were disposed of at a premium ranging from Rs. 10 to Rs. 80 per candy, leaving only a small balance on hand at the end of the year.

CENTRAL PROVINCES AND BERAR.

Scheme for distribution and marketing of Jarila cotton in Central Provinces and Berar.—A small scheme for the distribution of *Jarila* seed, sufficient for 1,000 acres each in 17 *tahsils* and for roguing the area thoroughly, was sanctioned by the Committee in January 1943, for a period of one year. It came into operation in September 1943. The present scheme was sanctioned in January 1944 for a period of three years from the 1st March, 1944. In November 1947, it was extended for a period of two years. Its object is to arrange for the distribution of pure seed of *Jarila* in Berar, excluding the Pusad *talug*, covering an area of two lakhs acres.

During the year under report, the Department of Agriculture distributed 9,983 maunds of pure seed of stages III, IV, V and VI to cover an area of 66,313 acres against 22,082 maunds to cover 91,728 acres in the previous year. The reduction in acreage is attributed to (1) the susceptibility of *Jarila* to the vagaries of monsoon and particularly to late rains and (2) the decrease in the premia paid for *Jarila* over local or *Oomras* type.

A total quantity of 14,681 maunds of seed of various stages has been stocked for distribution in the ensuing year and is expected to cover 78,300 acres.

The marketing of *Jarila* was done through the pool organisation, which received during the year 1,156 bales for disposal, against 2,817 in the previous

year. The average premium obtained over the Indian Cotton Contract price was Rs. 68-6, and the gross extra income realised by the growers of Jarila from 1,233,417 acres was estimated at Rs. 35,71,054 against Rs. 62,65,576 from 1,387,684 acres in 1946-47.

MADRAS.

(a) **Scheme for maintenance of nucleus of pure seed of improved varieties of cotton in Madras Province.**—This scheme was sanctioned by the Committee in January 1938 for a period of five years and came into operation on the 12th September, 1938. In July 1943, it was extended for a further period of five years for the maintenance of nucleus of the four strains, Co.2, Co.4, K.1 and N. 14. In November, 1947, it was again extended for five years for the maintenance of nucleus of the five strains, Co.2, 4706, Co.3, H.1 and N. 14.

The 'selfed' area of each variety and the quantity of 'selfed' seed produced during the year are given below :—

Name of variety.	Area 'selfed.'	Quantity of 'selfed' seed produced.	Proposed disposal of seed.
	Acres.	lbs.	
Co.2.	1.5	233	For Central Farm sowings and for inner seed farm at Tiruppur in 1948-49.
Co.4.	1.0	65	For sowing in the inner area in Ramnad district in 1948-49.
N.14.	2.0	130	For sowing in multiplication blocks at the Nandyal station in 1948-49.

(b) **Scheme for multiplication and distribution of C. 11-2 cotton in Coimbatore district of Madras Province.**—This scheme was sanctioned in August 1946 for a period of three years. It came into operation on the 1st July, 1946. The object of the scheme is to extend the cultivation of the improved strain C. 11-2 over an area of one lakh acres in the rainfed region of Coimbatore district.

During the year under review, the total available quantity of 94,883 lbs. of seed was distributed to cover an area of 5,249 acres. The extension of the

variety was adversely affected by the inadequacy and late arrival of sowing rains. Droughty conditions persisted after sowing and adversely affected the cotton crop in general, but it was observed that C-11-2 was appreciably resistant to them.

Owing to the non-functioning of the Cotton Market Committee at Tiruppur, the lint produce had to be disposed of to the dealers directly at the best available rates. About 58,800 lbs. of lint (approximately 150 bales) were sold up to July 1948 against 70,425 lbs. (approximately 180 bales) during the previous season. A premium of 6% over local variety was said to have been realised, and it is estimated that the growers earned an extra income of Rs. 52,490 from an area of 5,249 acres or Rs. 10 per acre.

BARODA STATE.

(a) **Scheme for creation of a pure Wagotar cotton zone in Mehsana district in Baroda State.** This scheme was sanctioned by the Committee in July 1945 for a period of 2 years and 7 months. It came into operation on the 1st January, 1946, and terminated on the 31st July, 1948.

The object of the scheme was to cover the whole of the closed boll tract of Mehsana district, extending over 54,000 acres, with *Wagotar*, a strain of *herbaceum* cotton developed by the Department of Agriculture, Bombay, at its research station at Viramgam.

During the year under report, 857,850 lbs. of *Wagotar* seed were distributed by the Department for sowing an area of 40,400 acres. Of this area, 1,893 acres (25 acres of nucleus seed, 186 acres of A grade and 1,682 acres of B grade) were controlled by the Department. In comparison with the local cotton grown in adjacent areas, the *kapas* of *Wagotar* sold dearer by Re. 0-8 per standard maund.

(b) **Scheme for distribution and multiplication of Vijaya cotton in Baroda State.**—This scheme was sanctioned by the Committee in January 1944 for a period of five years and it came into operation on the 1st April, 1944. It aims at the replacement of B. D. 8 cotton by Vijaya over approximately 300,000 acres in the black soil areas of Baroda State.

During the year under report, the Department of Agriculture sold 3,590,595 lbs. of seed to cover 226,463 acres, representing the total area under cotton in the tract. Of this, 40,874 acres (5,383 acres of A grade and the balance of B grade) were under Departmental control. The total quantity

of seed cotton pooled by the Department amounted to 1,79,544 maunds and that sold by cotton sales societies and unregistered groups of growers amounted to 70,116 maunds. Up to June 1948, 6,258 bales had been given Agmark labels by the Department. A further lot of 2,860 bales from the pooled produce of the cotton sales societies and unregistered groups of growers was also agmarked. The premium obtained for certified *kapas* over non-certified seed cotton was Rs. 5 per *bhar* of 924 lbs. and that for certified lint, Rs. 10 per candy of 784 lbs. over non-certified lint.

It is estimated that the farmers growing Vijaya cotton on an area of 226,463 acres earned an additional income of Rs. 92,84,983 in comparison with what they would have earned if they had grown the ordinary B. D. 8 cotton.

(c) **Scheme for distribution of Suyog cotton seed in Navsari district of Baroda State.**—This scheme was sanctioned by the Committee in January, 1945, for a period of five years. It came into operation on the 1st April, 1945. The scheme aims at the replacement of 1027 A. L. F. by *Suyog* over the whole of Navsari district.

During the year under report, the Department of Agriculture, Baroda, sold 1,495,495 lbs. of controlled seed, covering a total estimated area of 149,615 acres, against, 2,168,030 lbs. of seed covering 160,000 acres in 1946-47. Of the total area sown, 19,118 acres (2,060 acres of 'A' grade and the remainder of 'B' grade) were under Departmental control. 68,734 maunds of cotton were pooled and 2,397 bales were agmarked up to the date of reporting. The premium realised by agmarked bales over non-certified cotton was Rs. 40 for red labelled (Agmark Pedigreed) and Rs. 15 to Rs. 30 for black labelled (Agmark certified) cotton.

The total extra income earned by the cultivators of *Suyog* is estimated at Rs. 11,68,867 from an area of 149,615 acres or Rs. 7/13 per acre.

MYSORE STATE.

Scheme for multiplication and distribution of Sel. 69 and M. A. V. in Mysore.—This scheme was sanctioned by the Committee in January 1945 for a period of 5 years. The scheme came into operation on the 1st June, 1946. The object of the scheme is to extend the cultivation of (i) Sel. 69, an improved Asiatic cotton, in the black soil tract of the State covering an area of about 64,000 acres and (ii) Mysore-American, M.A.V, in the red soil

tract extending from 16,000 to 20,000 acres, under rainfed and irrigated conditions.

The seasonal conditions during the year under review were not favourable for cotton cultivation.

Sel. 69.—Ten pounds of selfed seed obtained from an area of 1 acre were utilised to raise a pure nucleus crop at the Babbur Farm. In all 20 lbs. of seed were obtained for the next stage of multiplication. The area under Sel. 69 during the year was said to be 60 acres only.

M.A.V.—In collaboration with the Co-operative Marketing Society Arasikere, 70,000 lbs. of bulk seed were distributed, and an area of 3,000 acres against 1,200 acres in the previous year, was covered. Up to the date of reporting, a quantity, of 98,500 lbs. of seed had been collected and another 50,000 lbs. was expected to be collected for distribution in the following season. M. A. V fetched a price of Rs. 10/12 per maund of 28 lbs. *kapas* against Rs. 9/6 per maund obtained by the local variety at Arasikere. The corresponding prices realised at Davangere were Rs. 12/2 and Rs. 9/8 per maund, respectively.

CHAPTER VI.

PROGRESS IN THE INTRODUCTION OF IMPROVED VARIETIES OF COTTON.

The area under improved varieties of cotton in the Indian Union during the year under review was estimated at 5,148,000 acres or 47% of the total cotton area as compared with 5,249,000 acres or 45% of the total area in the previous year. The improved varieties in cultivation were mainly of medium and long staple types in accordance with the policy of the Committee to increase the production of such cottons. The extent to which the average staple of the crop during the past quarter of a century has been improved as a result of this policy, which was carried out in collaboration with the Provincial and State Departments of Agriculture, is illustrated in the table below :—

TABLE I.

Year. (1st September to 31st August).	Production.			
	(In thousand bales of 400 lbs. net).			
	Long and medium staple ($\frac{7}{8}$ " and above).	Short staple (below $\frac{7}{8}$ ").	Total all staples.	Percentage of Col.2 to Col.4.
1	2	3	4	7
1922-27 (Av)	1,622	3,827	5,449	30
1927-32 „	1,327	3,879	5,206	25
1932-37 „	1,650	3,665	5,315	31
1937-42 „	2,117	3,480	5,597	38
1942-47 „	2,649	1,478	4,127	64

The above figures relate to undivided India and it will be seen that the proportion of cotton of staple length $\frac{7}{8}$ " and above to the total production increased from 30% in the quinquennium 1922-27 to 64% in the quinquennium

1942-47. The sudden jump to 64% in the last quinquennium was due partly to the deliberate diversion of a large area of short staple cotton to food crops and partly to the substitution of medium and long staple varieties for inferior types of cotton. On the commencement of World War II, and more particularly after the start of hostilities with Japan, the exports of short staple cotton were virtually cut off and cotton of this type became a drug on the market.

As a result of the partition of the country in August, 1947, to which reference is made in Chapter II of this report, the acreage under cotton in the Indian Union was greatly reduced (Cotton Map India). The table below shows the production of cotton in the Indian Union classified according to staple lengths ' $\frac{7}{8}$ " and above' and 'below $\frac{7}{8}$ "' for the year 1947-48 with corresponding figures for 1946-47 for purposes of comparison. It may be added here that the figures given in this table are based on the revised classification as explained in Chapter III of this report.

TABLE 2.

Year. (1st September to 31st August).	Production.			
	(In thousand bales of 400 lbs. net).			
	Long staple ($\frac{7}{8}$ " and above).	Medium and short staple (below $\frac{7}{8}$ ").	Total all staples.	Percentage of Col.2 to Col.4.
1	2	3	4	5
1946-47	409	1703	2112	19
1947-48	386	1730	2116	18

The proportion of cotton of staple length $\frac{7}{8}$ " and above (now termed as long staple) to the total production thus formed 18% during the year under report against 19% in the previous year.

It is worthy of note that the improvement in the quality of cotton has been accompanied by a not inconsiderable rise in the yield per acre of cotton. This will be evident from the following table in which two sets of figures of

yield, one based on the official crop forecasts and the other on the figures of actual crop calculated from cotton pressed, unpressed cotton consumed in mills, extra-factory consumption etc., are given :—

TABLE 3.

Period. (Year 1st September— 31st August).	Area (Thousand acres).	Production. Government estimates (Thousand bales of 400 lbs. net.)	Yield per acre (lbs) Col.3 Col.2,	Approximate commercial crop. (Thou- sand bales of 400 lbs. net.)	Yield per acre calcu- lated from approximate commercial crop. (lbs.) Col. 5 Col.2.
1	2	3	4	5	6
Average 1922-27 ..	24,723	5,449	87	*5,954	96
„ 1927-32 ..	24,738	5,206	84	*5,851	95
„ 1932-37 ..	23,912	5,315	89	*6,447	108
„ 1937-42 ..	23,656	5,597	95	†6,457	109
„ 1942-47 ..	16,932	4,127	97	†4,793	113
§ 1947-48 ..	10,932	2,116	77	‡3,190	117

* Calculated from mill consumption (mill consumption in Burma included up to 31st March, 1937) plus exports (Exports from Burma included up to 1934-35) plus extra factory consumption (the figure of 450,000 bales for the whole of India, based on enquiries conducted by the Committee in selected areas, has been used throughout). Variation in stocks has not, however, been taken into account.

† Best estimates of the crop as arrived at by the Indian Central Cotton Committee in connection with the annual post-mortem examination of all India cotton forecasts.

‡ Provisional.

§ Relates to the Indian Union.

Although the figures given in column 6 indicate a progressive improvement in the average yield per acre of the crop, there is still much scope for improvement in this direction and measures to achieve the end in view are under the active consideration of the Committee.

The main principle adopted by the Committee in making its recommendations for the spread of improved varieties of cotton is the extra income to the grower, and on the basis of the data furnished by Provinces and States in respect of the improved varieties for the extension of which seed distribution

schemes have been put into operation with the aid of funds provided by the Committee, it is estimated that the additional benefit accrued to the growers of improved varieties of cotton during 1947-48 was about 5.0 to 5.5 crores of rupees in the Indian Union.

The progress made in the introduction of improved varieties of cotton in the major cotton growing Provinces and certain Indian States is dealt with below :—

BOMBAY PROVINCE.

The total estimated area under cotton in the Province during 1947-48 was 1,663,087 acres.

Broach Tract :—

Out of the total area of 226,696 acres, the estimated area under *Vijaya* cotton was 210,600 acres, against 184,750 acres in 1946-47. Out of a total quantity of 1,008,305 lbs. of *Vijaya* seed handled this year, against 1,493,507 lbs. in the previous year, 151,335 lbs. were distributed by the Agricultural Department, and 856,970 lbs. of seed were directly supplied to the growers by the Co-operative Societies in Middle Gujerat under the supervision of the Agricultural Department.

In all, 5,322 full pressed bales of pure *Vijaya* cotton were produced under Departmental control and disposed of at premiums varying from Rs. 145 to Rs. 215 per Bombay candy f.o.r. Bombay, on the March and May Indian Cotton Contract quotations.

Vijaya cotton has already established its popularity due to its intrinsic quality which accounts for its demand by the trade ever since its introduction. Further, an area of 19,200 acres was sown with *Vijaya* in Chhota Udepur State, the total area under cotton in this tract being 37,217 acres.

Wagad Tract :

Out of the total area of 210,259 acres, the estimated area under Wagotar was 188,021 acres.

A scheme for multiplication and distribution of Kalyan cotton (an improved variety of cotton superior to local Wagad) has been sanctioned by the Indian Central Cotton Committee. 36,120 lbs. of seed of this variety was distributed by the Department to cover an area of 1,914 acres. The distribution of the previous improved type, Wagotar, was discontinued.

Khandesh—Jarila Tract.

Jarila cotton, which has been introduced into general cultivation in Khandesh, is superior to local or Banilla in staple and is highly wilt-resistant. Its yield and ginning outturn are equal to those of the local type and it has admirably adapted itself to the conditions of the Khandesh Tract. Jarila is now the established and recognized variety of this Tract and is appreciated both by the cultivator and the trade.

Out of a total area of 237,993 acres, the estimated area under Jarila cotton was 229,929 acres of which 124,187 acres were controlled by the Department. The seed multiplication scheme for Jarila subsidised by the Committee was continued. During the year under report, 9,366,760 lbs. of pure seed of Jarila was distributed by the Department. There was no increase in area owing to adverse seasonal conditions and also to the fact that the cultivator was getting higher monetary return for his groundnut crop compared with what he obtained for cotton. The cotton from controlled area fetched Rs. 30 to Rs. 80 more than the ruling quotations for Jarila in Bombay Market.

The Cotton Control Act as well as the Cotton Transport Act remained in force as in the previous year. No other cotton but Jarila is now grown in the Khandesh Division.

In the Barsi-Nagar tract, there was an approximate area of 17,600 acres under Jarila against the total cotton area of 22,053 acres.

Surat Tract.

Against the total area of 126,869 acres under cotton, the estimated area under Suyog variety was 85,000 acres representing 67% of the total area. The Agricultural Department handled 1,168,282 lbs. of Suyog seed. The produce of the controlled area was Agmarked under the Grading and Marking Scheme and 14,432 agmarked bales of Suyog were disposed of at an average premium of Rs. 26/13 per candy over non-agmarked bales. The quality as well as the staple length of Suyog was maintained as in the past year.

Under the scheme for cultivation of 1027 A. L. F. cotton in the Nawapur Taluka of West Khandesh District, the whole Taluka is now covered with

1027 A. L. F. cotton. The total quantity of seed supplied during the year being 223,397 lbs. In all 514 agmarked bales of 1027 A. L. F. were sold at an average premium of Rs. 54/9 per candy over non-agmarked bales.

Kumpta-Dharwar Tract.

The total estimated area under cotton in the three districts of Dharwar, Belgaum and Bijapur of the Bombay Karnatak, including the Deccan States, for 1947-48 was 800,000 acres. Three improved varieties of cotton have been introduced in this Division by the Department of Agriculture. These are Jayawant (*herbaceum* type), Gadag No. 1, and Cambodia (*hirsutum* types). Jayawant and Gadag No. 1 are grown mainly as rainfed crops. The total estimated area under these improved varieties during 1947-48 was:—Jayawant, 572,016 acres (of which 56,882 acres were under natural spread and 515,134 acres under departmental seed) and Gadag No. 1, 171,010 acres, of which 50,320 acres were under natural spread and 120,690 acres under departmental seed.

Jayawant, which at present occupies the whole of the Kumpta cotton tract of the Bombay Karnatak, was evolved from the bulk Kumpta cotton, previously grown in the tract, with the main object of meeting the then (1930) pressing need of the cotton growers and the textile mills for a variety of cotton, having desirable agricultural and commercial characters such as, long staple, high ginning outturn, finer spinning capacity and resistance to wilt disease etc. The average staple length of Jayawant is 7/8", its ginning outturn varies from 26 to 28% and it spins up to 37's (H. S. W. C.). The cultivation of this improved cotton is concentrated in the whole of the Kumpta Protected area and the major part of the Bijapur District. This cotton is sold at a premium of Rs. 50 to Rs. 100 per Bombay candy over Jarila (Standard cotton) in the Bombay market.

Gadag No. 1 which is a selection from the acclimatised Dharwar-American cotton, occupies the whole of the Dharwar-American cotton tract of the Bombay-Karnatak (Gadag, Ron and parts of the Haveri and Ranabennur Talukas of Dharwar District). The average staple length of this cotton is 13/16", its ginning outturn is 33.8% and it spins up to 33 (H. S. W. C.). It is sold at a premium of Rs. 40 to Rs. 90 per Bombay candy over Jarila (Standard cotton) in the Bombay market.

The total quantity of seed of the two improved varieties of cotton distributed by the Department in the year under review is shown below :—

	Quantity of seed distributed. lbs.
1. Jayawant	5,649,670
2. Gadag No. 1	1,635,400

MADRAS.

The average area under cotton in the Madras Province during the five years ending 1944-45 represents 10.7% of the total area under cotton in India.

The total area under cotton in the Madras Province during 1947-48 according to the additional forecast report was estimated at 1,360,900 acres against 1,565,800 acres for the corresponding period of the previous year. The present estimate for the province represents a decrease of 13.8% as compared with the finally recorded area of 1,579,000 acres in 1946-47. The fall in general was distributed in all the districts except Vizagapatam, Bellary, Chingleput and South Arcot where there is an increase. The decrease was marked in Salem, Coimbatore, Madura, Ramnad and Tinnevely. This was mainly due to the failure of rains during the sowing season, i.e., in October and November 1947 and to some extent to the diversion of the areas to ground-nut and *chulam*.

A. Cambodia cotton.—The area under Cambodia cotton during the year was 260,700 acres against 337,700 acres in 1946-47. The improved strains Co.2, Co.3, Co.4, 4463 and 920 continued to be popular and covered an area of 198,847 acres which works out to 76% of the total area under Cambodia, against 86% estimated in 1946-47. Strain Co.2 being very cosmopolitan continued to occupy largest individual area and figured in all the districts growing Cambodia. The area under strain Co.3 decreased by 49% and its cultivation was confined to Salem, South Arcot and Trichinopoly districts. Co.4 recorded a total fall of 3% in area. Its spread was mainly confined to Ramnad, Tinnevely and Madura districts. The last two districts recorded increased acreage during 1947-48 as compared to the previous season. Strain 920 declined in acreage by 72% while 4463 increased by 58% as compared to previous season. The cultivation of these two strains was confined to Coimbatore district only. The extent of the spread of the different varieties is indicated in Table 1.

TABLE I.

Cambodia cotton.

Area as per forecast—260,700

Districts.	Name of strain.	Quantity of seeds distributed by		Total area under the strain inclusive of natural spread.
		Madras Agricultural Department. lbs.	Co-operative Societies.	
				Acres.
Madura	Co.2	29,400	....	46,740
Ramnad .. .. .	"	....	....	1,200
Tinnevely	"	2,852	....	2,095
South Arcot	"	224	....	2,152
Salem .. .. .	"	....	....	13,750
Coimbatore	"	4,10,490	....	82,300
Trichy .. .. .	"	....	....	6,272
Malabar	"	1,274	....	1,300
Ananthapur	"	196	....	100
Kurnool .. .. .	"	....	....	224
North Arcot .. .. .	"	....	....	80
	Total ..	4,43,936	..	1,56,213
South Arcot	Co.3	1,000	....	470
Salem	"	8,823	59,500	11,850
Trichy .. .. .	"	....	....	1,000
	Total ..	9,823	59,500	13,320
Madura	Co.4	....	....	3,000
Ramnad	"	46,479	....	9,985
Tinnevely	"	6,302	....	4,210
South Arcot	"	2,800	95	825
Chingleput .. .. .	"	....	....	20
	Total ..	55,581	95	18,040
Coimbatore	920	....	....	4,704
Coimbatore	4463	16,284	....	6,570
GRAND TOTAL		5,25,624	59,595	1,98,847

The agencies which multiplied and organised the sale of pure seeds were (1) The Madras Agricultural Department for Co.2, Co.3, Co.4 and 4463 (2) The co-operative Sales Society at Tirupur for Co.2 (3) The Co-operative Society at Salem for Co.3.

B. Tinnevelles.—The total area under Tinnies recorded during the year 1947-48 was 4,08,400 acres against 5,40,700 acres as per additional forecast report of 1946-47 indicating a reduction of 24%. The estimated acreage of 1,77,104 acres under the improved Karunganni strains, vide Table II works out to 43% of the total Tinnevelles as against the same percentage recorded last year. The new and improved strain 4706 renamed as K2 which has the merit of suffering less shedding than K1 under unseasonal rains in addition to being of better quality was distributed to a small extent during the year in Tinnevelly district pending the launching of a separate seed distribution scheme. Strain C.11-2 renamed as Co.5 showed an increase in acreage by 44% as compared to last season largely due to the working of a scheme to multiply and distribute the seed on a large scale at Palladam in Coimbatore district.

TABLE II.

Tinnies :

Area as per forecast 4,08,400 acres.

District.	Name of strain.	Quantity of seed distributed by		Total area under the strain inclusive of natural spread acres.
		Madras Agricultural Department.	Co-operative Societies.	
Tinnevelly	K1	1,800	1,18,200	66,801
Madura .. .. .	"	....	....	4,500
Ramnad	"	39,205	6,250	57,713
Coimbatore .. .. .	"	....	....	27,640
Total .. .. .	..	41,005	1,24,450	1,56,654
Tinnevelly	K2	1,524	....	150
Coimbatore	Co5	1,16,900	....	20,300
GRAND TOTAL .. .. .	..	1,59,429	1,24,450	1,77,104

C. Salems. The area under the "Salems" decreased to 9800 acres during 1947-48 against 12,600 acres estimated in the additional forecast report of 1946-47. Improved strain Co.5 will be arranged to be distributed in the Trichinopoly district from 1948-49 onwards to replace the inferior types of cotton now grown.

D. White and Red Northern.—There was a fall during the year to 67,000 acres from 75,500 acres recorded last year. N14 was the only strain grown over an area of 1350 acres occupying 2% of the total area under white and Red Northern. The spread of the strain is limited due to want of proper organisation for multiplication and distribution of the seed.

TABLE III.

Northern. Area as per forecast 67,000 acres.

District.	Name of strain.	Quantity of seed distributed by		Total area under the strain inclusive of natural spread acres.
		Madras Agricultural Department.	Co-operative Societies.	
Kurnool	N14	....	....	13,50

E. Western. The estimated area in 1947-48 was 5,01,000 acres against 5,18,050 acres estimated in 1946-47 as per additional forecast. The area under the improved strain H1 was estimated at 3,79,545 acres which works out to 76% of the total area under the westerns and an increase of 3% over the last year's acreage.

TABLE IV.

Western. Area as per forecast 5,01,000 acres.

District.	Name of strain.	Quantity of seed distributed by		Total area under the strain inclusive of natural spread acres.
		Madras Agricultural Department.	Co-operative Societies.	
Anantapur	H1	47,970	....	34,200
Cuddapah	"	66,170	....	16,280
Bellary	"	1,48,175	13,000	2,97,115
Kurnool .. .. .	"	....	....	31,950
Total .. .. .	..	2,62,315	13,000	3,79,545

F. Warangal and Cocanadas. The estimated area under this variety of cotton was 83,900 acres, compared to 77,800 acres during 1946-47. Strain x20 renamed G1 (Guntur 1) a hybrid strain between two cocanadas cotton was found to be suitable for the tract. Its spread was confined to 236 acres in the districts of Guntur and West Godavari. An increase in the area under this strain is expected in future with the aid of a seed distribution scheme running at Guntur.

TABLE V.

Warangal and Cocanadas.

Area as per forecast 83,900 acres.

District.	Name of strain.	Quantity of seeds distributed by		Total area under the strain inclusive of natural spread acres.
		Madras Agricultural Department.	Co-operative Society.	
Kurnool	..			
Guntur	21	....	216
West Godavari	200	....	20
Total	221	....	236

CENTRAL PROVINCES AND BERAR.

The total area under cotton in the province during the year 1947-48, was 2,910,350 acres (actuals) as against 2,966,719 acres (actuals) of last year. There has been a small decrease in the area, which can be attributed to the general trend of lower prices dominating throughout the season 1946-47 and partly due to the unfavourable season.

VERUM 434:—

The area under Verum 434 was 387,768 acres against 325,775 acres of last year. The strain possesses fine strong staple about 7/8" in length and is capable of spinning up to 30's H. S. W. C. The area under this variety is distributed all over the province. The departmental spread is mostly concentrated in Pusad, Basim, Murtizapur and Amraoti *taluqs* of Berar and Khandwa and Harsud *tahsils* of Nimar districts in the Central Provinces. 6561 mds. of seed was distributed for sowing purposes through the departmental, co-operative and other agencies.

BURI 107:—

The total area under this variety in the different parts of the province was 45,096 acres against 52,682 acres of last year. This strain possesses fine staple, about 1" in length and is capable of spinning upto 40's H. S. W. C. The area under this variety is mostly concentrated in Nimar district. 1353 mds. of seed was distributed for sowing purposes in the province by the department.

EAST PUNJAB.

The total area under cotton in the East Punjab was estimated at 3,15,000 acres. Of the total area 2,49,900 acres were grown under *desi* cottons and 65,100 acres under American varieties. The American varieties thus constituted about 21% of the total East Punjab cotton crop. The following estimated area was under the improved cottons :—

		<i>Areas where cultivated.</i>
4 F	11,339 acres.	Ferozepore
L. S. S.	48,510 „	„
216 F	302 „	Hissar
39 Moll-M 60 A2	1,02,774 „	Jullundur, Hoshiarpur, Ferozepore, Hissar.

4F.—A selection of acclimatized Punjab-American characterised by dwarf stout plants of rather bushy habit. Its leaves and stems are profusely hairy. Grown mostly in Ferozepore District.

Particulars of the variety are :

Staple length	.. ..	.76"
Ginning percentage	.. ..	32.5%
Highest standard warp counts	.. ..	22

L.S.S.—This is a selection made from 4F but differs from that variety in having more bushy plants. Semi-naked seeds with white fuzz and longer staple (suitable for Ferozepore District)

Particulars of the variety are :—

Staple length	.. ..	.88"
Ginning percentage..	.. ..	33.0%
Highest standard warp counts.	.. ..	40

216F (Haryana).—This is an early ripening variety of American cotton giving first picking at the same time as *desi* cotton. The plants are profusely hairy and are highly resistant to Jassids. The variety has been found suitable for cultivation in the irrigated areas of Hissar, Rohtak and Gurgaon Districts.

Particulars of the variety are :—

Staple length	..	..	..	.90"
Ginning percentage..	..	..	..	33.0%
Highest standard warp counts	..	..	..	35

39 Mollisoni. This is a high yielding variety of *desi* cotton best suited for cultivation in Ferozepore and Amritsar Districts.

Particulars of the variety are :—

Staple length	..	..	..	.72"
Ginning percentage..	..	..	..	35%
Highest standard warp counts	..	..	..	8

M 60 A2. This improved variety of *desi* cotton is well adapted for cultivation in the whole of South-Eastern tracts of the Province, consisting of the districts of Hissar, Rohtak, Karnal, Gurgaon and part of Ambala.

Particulars of the variety are :—

Staple length	..	..	..	.60"
Ginning percentage..	..	..	..	38 to 40%
Highest standard warp counts	..	..	..	6

SEED DISTRIBUTION BY THE DEPARTMENTS.

Due to the disturbed conditions prevailing in all the districts of the East Punjab in 1947-48, normal work of seed distribution could not be carried out. Only the following quantities of pure seed could be distributed :—

Variety.	Weight in maunds.	Area sown in acres.
216 F	316 Maunds.	1475 acres.
4F		
L. S. S.	400 „	2000 „

UNITED PROVINCES.

Owing to the late monsoon in the majority of the districts, the cotton sowings commenced somewhat late. During the growing period of the cotton crop, there was more even distribution of rainfall so that weeding and other cultural operations could be generally carried out normally. The crop was medium to good all over the province except in the Bundelkhand Circle where it was stunted in growth on account of incessant and heavy rain.

The total area under cotton this year was 1,51,811 acres against 1,68,170 (revised) last year, showing a decrease of 9.7 per cent. As compared with the average areas of the preceding five and ten years, the area during the year under report shows decreases of 49.7 and 64.8 per cent, respectively.

The outturn of the crop was estimated at 41,000 bales (rounded) of 400 lbs. each against 43,800 bales (rounded and revised) last year, showing a decrease of 2,800 bales (rounded) or about 6.3 per cent. The estimated production of cotton this year is stated to have fallen short even of the usual requirements for village consumption.

IMPROVED VARIETIES.

The position regarding improved varieties in the province has further deteriorated. After the closing down of the Perso-American Seed Distribution Scheme, there is now no scheme under which improved varieties, either Perso-American or *desi* are being propagated. The following table gives the area, etc., under the improved varieties for the year 1947-48 :—

Variety.	Total area in acres.	Quantity of seed distrib- uted.	Area where the variety is chiefly concentrated.
All cotton	1,51,811	....	....
C.520	6,263	Non Depart- mentally.	Etah, Mainpur, Aligarh, Mathura and Buland- shahr.
P. Am.	1,378	„	Meerut (Hapur and Ghazi- abad) Bulandshahr, Ali- garh, Mathura, Etah (Kasganj) and Agra.

CHIEF CHARACTERISTICS OF THE IMPROVED VARIETIES.

C. 520 cotton is a pure line selection of “roseum” type isolated from the U. P. Bengals material collected in Saharanpur and Bijnor districts in 1920-21. It yields high under both irrigated and unirrigated conditions. When grown on a commercial scale at the Government Cotton Research Farm, Raya (Mathura), the variety yields about 9 to 10 maunds of *ṛkapas* per acre. This variety has an average staple length of 0.72 inches, gins about 35-37 p.c., and is capable of spinning up to 10—12-1/2 highest standard warp counts.

The variety had spread fairly wide in the cotton areas, but now owing to general decline in cotton cultivation due to high prices of food grains, its area also has gone down. It had also taken a good hold in some of the Central Indian States, Baroda, Rajputana and in some areas in the Eastern part of the Punjab. The *kapas* of this variety is valued at about 0-8-0 per md., more than that of the ordinary *desi* under normal trade conditions.

PERSO-AMERICAN COTTON.

It is a selection from the American types of cotton originally imported from Persia (Iran) and acclimatised in the United Provinces. When grown on a commercial scale at Raya and other suitable areas, e.g., Budaun, it yielded up to 13-14 mds. per acre. This variety has an average staple length of 0.85", gins 30-32 per cent., and is capable of spinning up to 28 to 34 highest standard warp counts. The *kapas* of this variety ordinarily fetches a premium of Rs. 1-8-0 to Rs. 2 per maund over *desi* in normal times. During the previous year, the extension scheme financed by the Indian Central Cotton Committee was closed after the sowing season.

HYDERABAD.

The total area under cotton in the State during 1947-48 was 1,912,000 acres.

The area under improved varieties together with a short history of each and the quantity of seed of each distributed by the Agricultural Department is given in the following table :—

Name of variety.	Description.	1947-48.		Remarks.
		Quantity of seed distributed.	Area actually sown.	
Gaorani 6.	A selection made in 1929 from Hyderabad Gaorani in Bhansa in Nanded district. An early maturing, fair yielding type with a staple length of 0.85 inch and ginning percentage of 32 ; capable of spinning 36's highest standard warp counts. It is under large scale cultivation and is specially suited to the north and north-eastern parts of the Gaorani Protected Area.	lbs. 51,25,561	acres. 2,56,272	Mostly confined to Nanded district.

Name of variety.	Description.	1947-48		Remarks.
		Quantity of seed distributed.	Areas actually sown.	
Gaorani SE-3.	A substrain of Gaorani 6 with a mean staple length of 0.85 inch, ginning percentage of 32, capable of spinning 35-40's highest standard warp counts.	3,14,650	15,732	Nanded taluqa.
Gaorani 12.	An earlier maturing reselection from Gaorani 12F which is as resistant to wilt in field as the parent. It has a staple length of 0.85 inch, ginning percentage of 32 and can spin 30's-35's highest standard warp counts.	1,59,250	9,950	Latur and Kallam taluqas of Osmanabad District and Udgir and Ahmedpur taluqas of Bidar district in the South-Western Gaorani Protected Area.
Raichur Kumpta 19	A selection from the local Kumpta crop of Raichur district. It is a good yielding drought and wilt-resistant variety with a staple of 0.81 inch, ginning percentage of 29-30 and is capable of spinning upto 24's highest standard warp counts.	88,768	2,913	Raichur taluqa of Raichur district.
Jaywant.	It is a segregate of a cross between Dharwar I and Dharwar II with a staple of 0.89 inch and ginning percentage of 28. It is capable of spinning 32-34's highest standard warp counts. It appears to be well suited to the western half of Raichur district.	72,189	7,219	Gangawati and Kopbal taluqas of Raichur district.

BARODA.

The total area under cotton in Baroda State during the year 1947-48 was 4,22,674 acres, distributed as follows :—

Baroda	..	..	..	..	2,31,658 Acres.
Navsari	..	..	..	..	1,29,389 „
Mehsana	..	..	..	..	55,362 „
Amreli	..	..	..	..	6,265 „

2. **Vijaya Cotton.**—This cotton covers the whole of Broach cotton tract lying in Baroda State between the two rivers, Narbada and Sabarmati. On account of its being grown in a high state of purity over an extensive area Vijaya has re-established the high reputation of Broach Cotton.

Suyog Cotton.—Suyog has practically covered the whole of the Surti tract in Baroda, i.e., the area lying South of the river Narbada. It was observed that Suyog stands up to water-logging brought about by incessant rains during monsoon and this is a very strong point in its favour, as the Surti tract is liable to heavy and continuous down pour.

Wagotar.—This cotton was introduced into the Wagad or closed boll tract of Baroda which extends from the Sabarmati river northwards; its cultivation is restricted to the Kadi and Kalol talukas. The area under this was 50,000 acres. From the year 1947-48 a new strain Kalyan, (K 72-2) has been introduced to replace Wagotar; an area of 23 acres was covered by it during the year under report.

3. The statements below show

(a) **The area controlled by the Department.**

	Vijaya Acres.	Suyog Acres.	Wagotar. Acres.
S. F. seed	4	2	1
Nucleus seed	36	25	25
Grade A seed	5383	2060	186
Grade B seed	35491	17058	1682
Grade C seed .. ..	..	..	38506

and (b)

the Quantity of seed distributed.

Vijaya	35,90,595 lbs.
Suyog	14,95,495 „
Wagotar	8,57,850 „

RAJPIPLA STATE.

The Rajpipla Cotton Improvement Act of 1921 has prohibited the import and sowing of Ghoghari or any other short staple cotton. The export likewise of cotton by rail or by boat is entirely prohibited except in the form of fully pressed bales, an exception being made only in favour of bona-fide *kheduts*

who are allowed to take their cotton in carts for sale outside the State. Best cotton seed of the 1027 A. L. F. variety is supplied by the State to the *Khedut* and only the long staple cotton of this strain is grown throughout the State. The cotton growth in the State has attained a high standard of reputation on account of its purity and finds ready customers in the market.

During the year under report the best seed was supplied as usual by the State to the cultivators.

The total area under cotton cultivation throughout the State was about 81,017 acres while the total output of the season was 26,591 bales pressed within the State and about 2,429 bales more, pressed outside the State limits from the cotton transported in cart by some cultivators of the outlying areas for sale outside the State.

The reduction in the production of cotton crop was mainly due to the "Grow More Food" campaign rigorously followed in the State.

MYSORE.

The total area under cotton of long, medium and short staples in the province is estimated at 68,600 acres during the year 1947-48 season. Of this area 3,000 acres were under the improved long staple M. A. V. cotton and 60 acres under medium staple cotton selection 69.

M. A. V.—This is a long staple cotton evolved in recent years under the Mysore Doddahatti Cotton Scheme of the Indian Central Committee and is increasing in popularity as a high priced fine cotton. This type seems to be well suited to the red loamy soils of the State and can be grown with equal facility both under rain-fed and irrigated conditions. Trials to examine its performance in the black soil tracts, have shown promising indications that this cotton is equally well suited to these soils, the only limitation being the time of sowing to be concurrent with that of the medium and the short staple cottons. The area and spread of this variety is more or less confined to the Western part of the State with an average rainfall of nearly 35 to 45 inches and spread over the four districts of Shimoga, Kadur, Hassan, and Mysore. The Northern District of Chitaldrug is also increasingly coming under this cotton. Its cultivation under assured supply of water from the Krishnarajasagara Reservoir Project, especially in the Malavalli Maddur Zone of the Irwin Canal, has been taken up recently and the first results are very encoura-

ging. It is hoped to develop this area as one of the large blocks for the development of this cotton. During the year under review, 1,48,000 lbs. of M. A. V. seeds were collected and distributed.

Selection 69. This is a medium staple cotton evolved by the Department as a substitute for the indigenous types in the Black Soil tracts. It is mainly suited to that particular type of soil and is largely grown in the Northern and North-Western Districts of Shimoga and Chitaldrug. It is also grown to some extent in the South East of the Southern District of Mysore, adjoining the Coimbatore District of Madras Presidency. During the year, 5,000 lbs. of Selection 69 seeds were collected and distributed.

Intensive propaganda is carried out through demonstration plots for the growing of improved strains and help is given in the timely cultivation of the crop. The advantages of marketing the produce through the Co-operative Societies are being vigorously brought home to the ryots and three such Societies are now in existence.

CHAPTER VII.

COTTON MARKETING, LEGISLATION AND OTHER PROTECTIVE MEASURES.

(i) Cotton Export Policy.

In November 1947, the Committee passed a resolution recommending to the Government of India that the exports of cotton should be allowed free to all permissible destinations up to the 31st March, 1948. The Committee also recommended that the ceiling prices of cotton should be removed as these had resulted in keeping the prices of Indian cotton artificially below world prices at the expense of the Indian cotton grower and it further suggested that the question of the control on prices of cloth should be reviewed in the light of the action that might be taken regarding the removal of the ceiling prices on cotton. With effect from the 15th January, 1948, the Government of India prohibited exports of cotton other than the five short staple varieties *viz.*, Bengal *deshi*, Oomra *deshi* (excluding C. P. I and II) Mathio, Assams and Comillas. This was done with a view to conserving supplies of cotton of the type required by Indian mills. The recommendation of the Committee for the removal of ceiling prices on cotton was given effect to from the same date, while control on cotton textiles was relaxed considerably. Towards the end of the season, however, both the controls were reimposed because immediately after decontrol the prices of both raw cotton and cloth rose unexpectedly high and the supplies of cloth at reasonable prices became scarce.

(ii) Exemption of Cotton, Cotton seed and Cotton Yarn from Sales Tax.—

The attention of the Committee was drawn to the United Provinces Sales Tax Bill in which cotton was not exempted from the tax. The Committee made a representation to the United Provinces Government that cotton, cotton seed and cotton yarn should be exempted from the sales tax as was the case in Bombay Province. The matter is still under the consideration of the United Provinces Government. A representation made by the Committee to the Government of Madras with a view to having cotton seed exempted from the Madras Sales Tax was reiterated. The Madras Government have again regretted their inability to accept the Committee's proposal.

(iii) System of Survey and appeal of East India Cotton Association.—

The recommendation made by the Indian Central Cotton Committee to the Government of Bombay, in connection with the control and regulation

of the cotton trade in Bombay, that the then existing system of survey under the bye-laws of the East India Cotton Association should be replaced by one of survey by whole time sworn paid surveyors, was accepted by the Government of Bombay and given effect to by the East India Cotton Association during the year under report.

(iv) **Revision of the Indian Cotton Contract.**—The question of revision of the Indian cotton contract was considered by the Local Sub-Committee of the Indian Central Cotton Committee in the light of the proposals made by the Hedge Contracts Sub-Committee of the East India Cotton Association. The majority of the Hedge Contract Sub-Committee had opined that the basis of the Indian Cotton Contract should be Fine Jarila, 3/4" in staple. However, the Local Sub-Committee after due consideration of the question suggested that with a view to discouraging mixing of cotton, the basis should be Fine Jarila 25/32", without any tolerance. In the revised contract as ultimately brought into force, Jarila 25/32", with a tolerance of 1/32" was adopted as the basis. Though this does not give full effect to the Committee's recommendation, nevertheless it is a step in the right direction which, it is hoped, would eventually lead to the abolition of the tolerance altogether.

(v) **Cotton Baling Hoops.**—

The arrangements for the distribution of cotton baling hoops were continued along the lines of the past year. During the year under report, some 6,903 tons of hoops were distributed to pressing factories in the country through the agency of this office working in conjunction with the Iron and Steel Controller. On the recommendation of the Baling Hoops Advisory Committee, the Government of India announced their decision not to fix any maximum rate for pressing cotton during the 1947-48 season, due to the varying rates of indigenous, English and American hoops.

(vi) **Fuel Requirements of Ginning and Pressing Factories.**—

The arrangements for the supply of coal, under priority, to cotton ginning and pressing factories on the recommendation of this office working in conjunction with the Textile Commissioner, Bombay, were continued during the season under report. The total quantity of coal recommended by this office for supply to ginning and pressing factories during the year amounted to about 1,63,000 tons. In addition, assistance was given to the factories in the matter of obtaining iron and steel required for maintenance and repairs.

(vii) Dismantling of Cotton Ginning and Pressing Factories.—

As in the previous years, this office continued to deal with applications for the grant of permission for the dismantling of cotton ginning and pressing factories, referred for opinion by the Textile Commissioner, Bombay.

(viii) Regulated Cotton Markets.—

In the past, the Cotton Committee had recommended to the Provincial and State Governments that they should establish regulated markets for the orderly and remunerative marketing of cotton. Accordingly, legislation for the establishment of regulated markets had been enacted in the Provinces of Bombay, Madras, the East Punjab and the Central Provinces and the Hyderabad, Baroda, Indore, Chota Udepur and Sangli States. In the year under report 15 regulated markets were functioning in the Province of Bombay under the Agricultural Produce Markets Act, and 4 more markets at Pandharpur, Barsi, Nargund and Athani are expected to function as soon as the bye-laws are approved. In the East Punjab, under the Agricultural Produce Markets Act, 1939, there were 44 market committees working in 1947-48. The Act has been extended to seven more areas where, however, market committees have yet to start functioning. In Madras, 3 regulated markets continued to function at Tirupur, Adoni and Nandyal. In the Hyderabad State under the Hyderabad Agricultural Produce Markets Act, 42 regulated markets functioned during the year under report as against only 34 in the previous year. The markets continued to work satisfactorily.

(ix) Agmarking.—

During the year, Agmarking of cotton bales continued at Hubli, Gadag, Bailhongal and Savanur as a guarantee of purity of cotton by affixing Agmark labels to bales after supervision of ginning and pressing by a special staff.

(x) Legislation to Maintain the purity of Cotton and other Protective measures.—

Several legislative measures have been passed by the Central and Provincial Governments on the recommendation of the Indian Central Cotton Committee with a view to checking the spread of undesirable or inferior types of cotton, insect pests and diseases and malpractices in marketing. A brief account of the working of these measures during the year under review is given below. For more details, previous reports may be referred to.

(a) **Cotton Transport Act.**—The Cotton Transport Act, in so far as it relates to rail transport only, had been applied to the East Khandesh and parts of West Khandesh and Nasik districts of Bombay Province in 1946. In the year under review these restrictions were extended to road transport as well. The Act continued to be in operation in the Kumpta, Dharwar, Bagalkot and Bijapur Protected Areas.

(b) **Cotton Ginning and Pressing Factories Act.**—

The Government of the undivided Punjab sent to the Committee for comments the draft Punjab Cotton Ginning and Pressing Factories Bill providing penalties against mixing, watering and adulteration of cotton. This was considered by the Committee and its comments thereon were duly communicated to the East Punjab Government.

The attention of the Committee was drawn to the fact that under the Cotton Ginning and Pressing Factories Act, cotton was defined as including cotton waste and enquiry was made whether cotton waste pressed should be accounted for in the cotton press returns prescribed under the Act. It was decided that in addition to the statistics of pressings of raw cotton, information regarding cotton waste pressed should also be collected. The Provincial and State Governments concerned were requested to amend the form of return prescribed under the Act to provide for the collection of the statistics for raw cotton and cotton waste separately.

Out of 68 Indian States which have enforced in their respective territories the main provisions of the Cotton Ginning and Pressing Factories Act as applied to what was formerly British India, by legislation or executive orders, weekly returns of cotton pressed were received from 33 States ; in the remaining States, pressing factories did not work during the year.

(c) **Prevention of Introduction of Foreign Cotton Pests.**—

In order to prevent the introduction into India of the Mexican Boll Weevil (*Anthonomus grandis*) with imported American cotton, at the instance of the Committee, regulations have been imposed by the Government of India under which the import of American cotton into India is prohibited except through the port of Bombay where it must be fumigated with hydrocyanic acid gas before entry into the country. The work of fumigation is carried out under the technical supervision of the Secretary, and the cost involved is

met by the levy of a small fee from importers on each bale of American cotton fumigated. During the year under review 20,628 bales of American cotton were imported and fumigated.

The restrictions on the import of foreign *kapas* (unginned cotton) and of foreign cotton seed remained in force throughout the year.

(d) **Cotton Control Act.**—Cotton Control Acts are in operation in the Provinces of Madras, Bombay and the Central Provinces and in the Baroda and Bhopal States. During the year, the Bombay Control Act, 1942, was repealed and in its place an amended Act—The Bombay Cotton Control (Repeal and Re-enactment) Act, 1947, was passed by the Government of Bombay. This provides for the prohibition of mixing of any standard cotton with another standard cotton.

It is reported that due to the vigorous propaganda carried out by the staff of the Central Provinces Agricultural Department, the cultivation and trade in Garrow Hill Cotton, against which the Central Provinces Cotton Control Act was directed, have become extinct.

K. SAWHNEY.

Secretary.

APPENDIX I.

BILL.

Further to amend the Indian Cotton Cess Act, 1923.

WHEREAS it is expedient further to amend the Indian Cotton Cess Act, 1923 (XIV of 1923), for the purposes hereinafter appearing ;

It is hereby enacted as follows :—

1. *Short title.*—This act may be called the Indian Cotton Cess (Amendment) Act, 1947.
2. *Amendment for section 3, Act XIV of 1923.*—In sub-section (1) of section 3 of the Indian Cotton Cess Act, 1923, the words “produced in India and either” and the proviso shall be omitted.
3. *Amendment to have retrospective effect.*—The amendment made by section 2 shall have effect as if this Act had come into force on the fifteenth day of August 1947.

STATEMENT OF OBJECTS AND REASONS.

This Bill is designed to prevent the loss of income to the Indian Central Cotton Committee consequent on the creation of the Dominion of Pakistan. Under the Indian Cotton Cess Act 1923, cotton produced in India and either consumed by the mills in India or exported is subject to the levy of a cess, the proceeds of which are utilised in financing the Indian Central Cotton Committee. As cotton produced in Pakistan is no longer cotton ‘produced in India’, it has become necessary to amend this Act with retrospective effect to permit levy of the cess on cotton produced in Pakistan and consumed in Indian Mills so as to prevent loss of income to the Committee in respect of Pakistan cotton consumed by Indian Mills.

(Sd.) RAJENDRA PRASAD

NEW DELHI,

8th December, 1947.

A. BILL* No. 62 of 1948.

A Bill further to amend the Indian Cotton Cess Act, 1923.

WHEREAS it is expedient further to amend the Indian Cotton Cess Act, 1923 (XIV of 1923), for the purposes hereinafter appearing ;

It is hereby enacted as follows :—

1. *SHORT TITLE*.—This Act may be called the Indian Cotton Cess (Amendment) Act, 1948.

2. *Amendment of section 3, Act XIV of 1923*.—In sub-section (1) of section 3 of the Indian Cotton Cess Act, 1923 (XIV of 1923) (hereinafter referred to as the said Act) for the words “two annas” and “six pies” the words “four annas” and “one anna” shall be substituted respectively.

3. *Amendment of section 4, Act XIV of 1923*.—In section 4 of the said Act.—

(a) for items (viii), (ix) and (x) the following items shall be substituted, namely.—

“(viii) nine persons nominated by the Central Government to represent the cotton growing industry, of whom two shall be nominated to represent the industry in Madras, two to represent the industry in Bombay, two to represent the industry in the United Provinces, two to represent the industry in the Central Provinces and Berar, and one to represent the industry in East Punjab ;

(ix) seven persons nominated respectively by the Governments of the following Acceding States, namely, Mysore, the United States of Gwalior, Indore and Malwa (Madhya-Bharat), the United State of Rajasthan, the United State of Vindhya Pradesh, the Patiala and East Punjab States’ Union, the United State of Kathiawar (Saurashtra) and Baroda ; and ”

(b) item (xi) shall be renumbered as item (x).

4. *Amendment of section 12, Act XIV of 1923*.—In sub-section (2) of section 12 of the said Act, after the words “in India”, the words “or for the improvement and development of the methods of growing, manufacturing and marketing of Indian cotton” shall be inserted.

5. *Repeal of section 12A, Act XIV of 1923*.—Section 12A of the said Act shall be omitted.

STATEMENT OF OBJECTS AND REASONS.

This Bill seeks to double the rate of the Cess leviable on cotton produced in India and either exported from any custom port to any outside India or consumed in any mill in India under the Indian Cotton Cess Act of 1923. Until the entry of Japan into the last war, the Central Cotton Committee enjoyed a sound financial position with an income of between Rs. 6 and Rs. 8 lakhs per annum. With the entry of Japan in the last War, the receipts from the Cess fell off considerably and the Committee had to draw upon its surplus balances to continue its programme of activities. As the surplus got depleted gradually, the Committee recommended in 1945 that the rate of the cess should be doubled.

*In pursuance of clause (a) of sub-section (1) of section 37 of the Government of India Act, 1935, the Governor-General has recommended the introduction of this Bill in the Legislature.

Before doing so, however, the Government of India decided to make grants from the Cotton Fund, which was built up from the proceeds of the import duty on raw cotton imposed by the Cotton Fund Ordinance (VIII of 1942). In order to enable the Committee to have a permanent source of income, it is considered necessary to double the rate of cess on cotton and also to permit the Committee to continue to receive grants from the Cotton Fund.

2. Under section 12 (2) of the Indian Cotton Cess Act, 1923, the Committee is permitted to apply the proceeds of the Cess on cotton and any other monies received by it to meet the cost of such measures as it may, with the previous approval of the Central Government, undertake for promoting agricultural and technological research in the interests of the cotton industry in India. This sub-section precludes the Committee from spending any monies received by it on development schemes. Since grants from the Cotton Fund can only be used for development schemes, it is proposed to amend this sub-section as well.

3. Opportunity is also being taken to undertake the following amendments due to the political changes in the country :—

(a) The representation granted to the cotton growing industry of the Punjab under section 4 (viii) is being reduced from two to one for East Punjab.

(b) The representation granted to Hyderabad State under section 4 (ix) is being deleted. The intention is to grant representation to this State under section 4 (xi) if and when negotiations with that State take a favourable turn.

(c) The representation granted to Gwalior and the States in Central India and Rajputana is being revised according to the re-grouping of the States into Unions, and representation is also being granted to certain other Unions and States, *e.g.*, Vindhya Pradesh, Patiala and East Punjab States' Union, Saurashtra and Mysore.

4. Section 12A of the Act is being omitted as it is obsolete.

JAIRAMDAS DOULATRAM

NEW DELHI :

2nd August, 1948.

APPENDIX II.

MEMBERS OF THE INDIAN CENTRAL COTTON COMMITTEE.

- (1) *President*, Sardar Datar Singh, Vice-Chairman, Indian Council of Agricultural Research, *ex-officio*.

The Agricultural Commissioner with the Government of India, *ex-officio*.

- (2) Representatives of Agricultural Departments :—

<i>Madras</i>	Shri M. S. Sivaraman.
<i>Bombay</i>	Dr. B. N. Uppal.
<i>United Provinces</i>	Dr. S. B. Singh.
<i>Central Provinces and Berar</i> ..	Shri P. D. Nair
<i>East Punjab</i>	Sardar Lal Singh.

- (3) The Director of Commercial Intelligence and Statistics, *ex-officio*.

- (4) Representatives of Chambers of Commerce and Associations :—

The East India Cotton Association	Shri Purshotamdas Thakurdas.
The Bombay Millowners' Association ..	Shri Bhagwandas C. Mehta.
The Bombay Chamber of Commerce ..	Mr. L. F. H. Goodwin.
The Indian Merchants' Chamber	Shri Chimanlal B. Parikh.
The Ahmedabad Millowners' Association ..	Shri Nanddas Haridas.
The Tuticorin Chamber of Commerce ..	Mr. A. Mueller.
The Upper India Chamber of Commerce ..	Major S. R. Pocock, M. C.
The Empire Cotton Growing Corporation ..	Vacant, <i>vice</i> Sir William Roberts.

- (5) Commercial Representatives nominated by Central Government :—

<i>Central Provinces and Berar</i>	Shri Pukharaj Kochar.
	Shri Kishanlal Goenka.
<i>Madras</i>	Shri Doraiswamy Naidu
<i>East Punjab</i>	Shri Ram Narain Varmani.

- (6) Bengal Representative Dr. N. Dutt.

- (7) Co-operative Banking Representative :—Vacant.

- (8) Representatives of Cotton Growing Industry :—

<i>Madras</i>	Shri D. Gnanasirmani.
	Shri H. Sitarama Reddy.
<i>Bombay</i>	Shri F. B. Loxmeshwar.
	Raje J. R. Deshmukh.
<i>United Provinces</i>	Major Mohd. Jamshed Ali Khan.
	Lala Basant Lal Agarwala.
<i>Central Provinces & Berar</i>	Shri S. K. Wankhede
	Shri P. S. Patil.
<i>East Punjab</i>	Sardar Gurbachan Singh Bajwa.

(9) Representatives of Indian States :—

<i>Hyderabad State</i>	..	..	..	Vacant.
<i>Baroda State</i>	..	..	..	Mr. C. A. MacLean, M.C.
<i>Gwalior State</i>	..	..	..	Vacant.
<i>Rajputana and Central India States</i>	..			Dr. D. V. Bal.

(10) Additional Members nominated by the Governor-General in Council :—

Shri R. G. Saraiya.	Dr. V. K. R. V. Rao.
Shri Chunilal B. Mehta.	Shri Biswanath Das.
Shri T. Vijayaraghavacharya.	Mr. Camar Tyabjee.
Shri Shankar Lal.	Shri W. R. Natu.
Shri Padampat Singhania.	Shri G. B. Patel.
Shri K. K. Chettur.	Shri R. Balasubramania Ayyar.
Shri P. H. Rama Reddi.	Mr. M. A. A. Ansari.
Mr. D. N. Mahta.	

APPENDIX III.

SUB-COMMITTEES.

Standing Finance Sub-Committee :—Shri R. G. Saraiya (*Vice-President*), Chairman ; Sardar Datar Singh (*President*) (*ex-officio*) ; Shri Purshotamdas Thakurdas ; Shri Chunilal B. Mehta ; Vacant *vice* Shri Chunilal V. Mehta ; Vacant *vice* Shri Madhaorao Deshpande ; Shri Chimanlal B. Parikh ; Shri Bhagwandas C. Mehta and Mr. D. N. Mahta.

Local Sub-Committee :—*President* (Sardar Datar Singh) ; *the Vice-President* (Shri R. G. Saraiya) ; Shri Purshotamdas Thakurdas ; Shri Chunilal B. Mehta ; Vacant *vice* Shri Chunilal V. Mehta ; Vacant *vice* Shri Madhaorao Deshpande ; Shri Bhagwandas C. Mehta ; Mr. D. N. Mahta ; Mr. L. F. H. Goodwin ; Shri Chimanlal B. Parikh ; Raje J. R. Deshmukh ; Dr. B. N. Uppal and Mr. A. Mueller.

AGRICULTURAL RESEARCH SUB-COMMITTEE.

- I. *The President* :—Sardar Datar Singh (*ex-officio*).
- II. *The Vice-President* :—Shri R. G. Saraiya.
- III. *The Co-operative Banking Representative* :—Vacant *vice* Shri Chunilal V. Mehta (*ex-officio*).
- IV. *Cotton Growers' Representatives* :—Vacant *vice* Sir William Roberts ; Vacant *vice* Shri Madhaorao Deshpande and vacant *vice* Mir Riyat Ali.
- V. *Cotton Trade Representatives* :—Shri Purshotamdas Thakurdas, Shri Chunilal B. Mehta, Mr. A. Mueller, Mr. L. F. H. Goodwin and vacant *vice* Seth Gopaldas Mohta.
- VI. *Agricultural Officers* :—The Agricultural Commissioner with the Government of India (*ex-officio*) ; Shri M. S. Sivaraman ; Mr. C. A. MacLean ; Shri P. D. Nair ; Dr. D. V. Bal ; Shri P. H. Rama Reddy ; Vacant *vice* Shri N. M. Deshmukh ; Dr. B. N. Uppal ; Shri D. V. Narayanayya ; Dr. S. B. Singh ; Vacant *vice* Shri Kalidas Sawhney.
- VII. *Additional Members* :—Shri T. Vijayaraghavacharya ; Mr. D. N. Mahta ; Shri W. R. Natu, Shri R. Balasubramania Ayyar ; Dr. S. D. Chaudhary ; Shri G. B. Patel ; Mr. M. A. A. Ansari ; Raje J. R. Deshmukh ; Shri S. S. Pande ; Prof. R. H. Dastur ; Shri D. L. Sen ; Dr. V. G. Panse ; Shri P. D. Gadkari ; Dr. S. M. Sikka.
- VIII. The Secretary, Indian Central Cotton Committee, (*ex-officio*).

TECHNOLOGICAL RESEARCH SUB-COMMITTEE.

The President, Sardar Datar Singh (*ex-officio*) ; *The Vice-President*, Shri R. G. Saraiya (*ex-officio*) ; The Agricultural Commissioner with the Government of India (*ex-officio*) ; Shri Purshotamdas Thakurdas ; Vacant *vice* Shri Chunilal V. Mehta ; Shri T. Vijayaraghavacharya ; Shri Chunilal B. Mehta ; Vacant *vice* Sir William Roberts ; Shri Padampat Singhania ; Shri Shankar Lal ; Mr. D. N. Mahta ; Mr. L. F. H. Goodwin ; Shri P. D. Nair ; Dr. B. N. Uppal ; Shri M. S. Sivaraman ; Major S. R. Pocock ; Vacant *vice* Seth Gopaldas

Mohta ; Mr. A. Mueller ; Shri Bhagwandas C. Mehta ; Shri Pukharaj Kochar ; Shri R. Balasubramania Ayyar ; Mr. M. A. A. Ansari ; Vacant *vice* Mir Riyat Ali ; Dr. K. Venkataraman ; The Director of Industries, Bombay ; The Principal, Victoria Jubilee Technical Institute, Bombay ; Shri S. S. Pande ; Dr. V. G. Panse ; Shri D. L. Sen (Director, Technological Laboratory) ; Shri P. D. Gadkari ; Shri G. B. Patel ; Vacant *vice* Shri Kalidas Sawhney ; Mr. Neville N. Wadia and Shri B. D. Kulkarni ; (Representing the Bombay Millowners' Association), Shri Arvindbhai Narotambhai and Shri Chandrakant Motilal ; (Representing the Ahmedabad Millowners' Association), Mr. Jehangir Pestonji Patel and Shri Jamnadas Ramdas ; (Representing the East India Cotton Association) and Shri S. Krishna (Representative of the Board of Scientific and Industrial Research).

COTTON FORECAST SUB-COMMITTEE.

The President, Sardar Datar Singh (*ex-officio*) ; *The Vice-President*, Shri R. G. Saraiya ; The Agricultural Commissioner with the Government of India (*ex-officio*) ; The Director General of Commercial Intelligence and Statistics ; Dr. V. K. R. V. Rao ; the Director of Agriculture, Bombay Province ; The Director of Agriculture, Madras Province ; The Director of Agriculture, United Provinces ; The Director of Agriculture, Central Provinces and Berar ; The Statistical Officer, Department of Industries and Commerce, Madras Province ; Vacant *vice* Shri Chunilal V. Mehta ; Shri Chunilal B. Mehta, Vacant *vice* Sir William Roberts ; The Commissioner of Agriculture, Baroda ; The Director of Land Records, Central Provinces and Berar ; Mr. D. N. Mahta ; Mr. L. F. H. Goodwin ; Shri W. R. Natu ; Mr. A. Mueller and Dr. V. G. Panse.

COTTON GINNING AND PRESSING FACTORIES SUB-COMMITTEE.

The President, Sardar Datar Singh ; *the Vice-President*, Shri R. G. Saraiya (*ex-officio*) ; Shri Chunilal B. Mehta, the Co-operative Banking Representative ; Vacant *vice* Shri Chunilal V. Mehta (*ex-officio*) ; Shri Purshotamdas Thakurdas ; Shri Bhagwandas C. Mehta ; Mr. A. Mueller ; Mr. L. F. H. Goodwin ; Vacant *vice* Sir William Roberts ; Major S. R. Pocock ; Shri G. V. Doraiswamy Naidu ; Shri Pukharaj Kochar ; Dr. B. N. Uppal ; Shri P. D. Nair and Shri D. L. Sen.

INDIAN CENTRAL COTTON COMMITTEE

Statement of Receipts and Payments for the year ended 31st March, 1948.

[illegible]

*3% Government of India Funding Loan 1966-68, of the face value of Rs. 1,50,000	1,52,953	2	0
4½% Government of India Loan 1955-60, of the face value of Rs. 26,600 ..	25,004	0	0
6% Bombay Municipal Debentures 1954, of the face value of Rs. 10,000	3,950	0	0
6% Rangoon Municipal Debentures 1955, of the face value of Rs. 3,83,500	4,15,328	2	0
	<hr/>		
	17,76,625	14	0

(Market value on 31st March
1948, Rs. 17,86,344-2-0 inclu-
sive of Rangoon Municipal
Debentures taken at cost).

Imprests :—

(1) Secretary's Office	1,500	0	0
(2) Director, Tech- nological Labo- ratory, Matunga	500	0	0
Carried over ..	27,80,947	10	3
Carried over	17,76,625	14	0
	9,92,895	4	7

* 3% Government of India Funding Loan 1966-68 have been deposited with the Imperial Bank of India, Bombay as security against any overdraft that may be required by the Committee.

Statement of Receipts and Payments for the year ended 31st March 1948—contd.

RECEIPTS.		EXPENDITURE.		
	Rs. a. p.	Rs.	a. p.	Rs. a. p.
Brought Forward ..	27,80,947 10 3			
		Brought forward	17,76,625 14 0	9,92,895 4 7
		(3) Director of Agriculture, Bombay ..	1,795 0 0	
		(4) Director of Agriculture, Sind ..	510 0 0	
		(5) Cotton Research Botanist, Lyallpur ..	150 0 0	
		(6) Plant Physiologist, Indore ..	400 0 0	
		<i>Suspense : Recoverable)</i>	<u>4,855 0 0</u>	
		(1) Committee's Accounts ..	1,118 8 2	
		(2) Hoops and Fuel A/c		
		Expenditure incurred		
		red 32,761 15 0		
		<i>Less :—</i>		
		Rpts. 2,598 1 0	30,163 14 0	31,282 6 2
				<u>18,12,763 4 2</u>

Less :—Overdraft Account with the Imperial Bank of India, Bombay, (against hypothecation of 3% Govt. of India Funding Loan 1966-68, of the face value of Rs. 1,50,000)
 † Total Closing Balance

24,710 14 6

17,88,052 6 1

Total .. 27,80,947 10 3

Total .. 27,80,947 10 3

We have examined the above Statement of Receipts and Payments of Indian Central Cotton Committee with the Books, Vouchers and Certified Returns of the Committee, have obtained all the Information and explanations we have required and certify that to the best of our information and explanation received the above Statement is a correct abstract of the figures appearing in the Books and is drawn up in conformity with the Rules under the Indian Cotton Cess Act, 1923.

† Includes Rs. 26,421.13-0 on account of Sinking Fund.

(Sd.) S. B. BILLIMORIA, & Co.

Registered Accountants, Auditors.

Bombay, 30th August, 1948.

Provident Fund Account as at 31st March, 1948.

RECEIPTS.	Rs.	a. p.	Rs.	a. p.	EXPENDITURE.	Rs.	a. p.	Rs.	a. p.
Opening Balance as on 1st April 1947 ..			6,97,341	1 8	Balance :—				
Less :—Adjustment of Suspense Receipts during 1946-47 ..			1,943	7 9	(Government Securities at Market Value).				
			6,95,397	9 11	3% Government of India Loan, 1949-52, of the face value of Rs. 35,000	35,393	12 0		
Subscribers' Contributions	26,026	0 0			4% Government of India Loan 1960-70, of the face value of Rs. 12,600	14,175	0 0		
Add :—Recoveries against Advances ..	13,008	5 0	39,034	5 0	National Savings Certificates of the face value of Rs. 6,07,500 ..	6,07,500	0 0		
			7,34,431	14 11		6,57,068	12 0		
Less :—Refunds to Subscribers who have resigned ..	32,531	15 11			Savings Bank Account with the Imperial Bank of India, Bombay	93	11 6		
Advances to Subscribers	14,251	3 0	46,783	2 11	Current Account with the Imperial Bank of India, Bombay ..	25,748	11 8		
			6,87,648	12 0		6,82,911	3 2		
Committee's Contributions received from Indian Central Cotton Committee ..	25,265	10 0			Investments Fluctuation Account:—				
Add :—Committee's Contribution received from Provincial Government for subscribers on depuration	1,216	14 0	26,482	8 0	(Depreciation in Market Value of Securities)			473	6 0
			7,14,131	4 0					

Less :—P a y m e n t s
made to Subscribers
who have resigned,
including transfers to
“ Lapses and For-
feitures Account ”
for Contributions
disallowed

31,790 3 7 6,82,341 0 5

Interest received on
Investments ..

1,599 6 0

Interest received on
Advances to Sub-
scribers

719 1 5

2,318 7 5

Less :—Interest paid
during the year to
Subscribers who
have resigned :—

On their own contri-
butions 1,102 1 0

On Committee's con-
tributions 502 14 5

Bank's Commission
for collection of in-
terest etc.

1 14 6 1,606 13 11 711 9 6

Lapses and Forfeiture
Account

331 15 3

Total ..

6,83,384 9 2

Total ..

6,83,384 9 2

Examined and found correct.

Bombay, 30th August, 1948.

(Sd.) S. B. BILLIMORIA, & Co.

Registered Accountants, Auditors.

INDIAN CENTRAL COTTON COMMITTEE

Balance Sheet as at 31st March, 1948.

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RECEIPTS				EXPENDITURE.			
Cotton cess		Cotton Fund.		Cotton Cess.		Cotton Fund.	
Rs.	a. p.	Rs.	a. p.	Rs.	a. p.	Rs.	a. p.
Cotton Cess Receipts 1,74,26,071 1 0				.. ..		
<i>Less</i> —Refund of cess to Burma .. 42,369 10 9				.. ..		
1,73,83,701 6 3		1,73,83,701 6 3		31,15,189 8 6			
<i>Interest account.</i>				.. ..		
Amount recovered on investments .. 25,12,375 8 10				.. ..		
<i>Add</i> —Refund of income-tax on interest .. 33,830 5 6				.. ..		
25,40,205 14 4		25,40,205 14 4		2,37,012 9 6			
<i>Less :</i>				.. ..		
1. Interest paid in advance at the time of purchase of Government Paper (since recovered), interest on temporary overdraft and Bank's commission for collection of interest .. 78,573 5 3				.. ..		
2. Interest credited to Provident Fund .. 4,886 6 2				.. ..		
3. Bank's withdrawal charges .. 6,279 18 0				.. ..		
4. Income-tax on interest .. 32,839 18 1				.. ..		
5. Brokerage for securities sold .. 828 10 0				.. ..		
Total .. 828 10 0				Total .. 99,551 8 9			
Total .. 828 10 0				Total .. 1,02,188 10 9			

I. A. Administration				31,15,189 8 6			
B. <i>Improvement of Cotton Marketing :</i>				.. ..		
(1) Cost of exhibits, travelling allowance of representatives on the Board of the East India Cotton Association and members of Standards Sub-Committee and cost of standards				2,37,012 9 6			
(2) Enquiry into cost of cotton production in India				2,71,963 8 9			
.. ..				5,08,976 2 3			
C. Travelling allowance of non-official members				3,35,013 10 9			
D. <i>Printing & Propaganda :—</i>				.. ..		
(1) Publicity & Propaganda				1,56,555 15 0			
(2) Printing & Distribution				1,77,561 8 6			
.. ..				3,34,117 7 6			
E. <i>Statistical Research :—</i>				.. ..		
(1) Studies of village consumption of Indian cotton				23,913 5 8			
(2) Improvement of cotton forecast				30,772 9 0			
(3) Crop estimating survey on cotton in C. P.				5,880 9 0			
(4) Statistical analysis of experimental data				2,020 10 0			
Total				99,551 8 9			
Total				1,02,188 10 9			

II. AGRICULTURAL RESEARCH GRANTS-IN-AID.

6. Provision of Sinking Fund ..	26,421 13 0	23,96,376 1 10			
	1,49,829 12 6				
	23,96,376 1 10				
Profit on conversion and sale of securities ..	4,22,834 0 2	4,22,834 0 2	(1) a. Surat Physiological..	2,45,189 11 3	2,45,189 11 3
Sinking Fund account ..	26,421 13 0	26,421 13 0	b. do. Writing up ..	5,314 7 8	5,314 7 8
Miscellaneous receipts ..	2,22,824 9 5	2,22,824 9 5	2) a. Surat Bollworm ..	1,14,509 9 7	1,14,509 9 7
Refund from Provident Fund for contributions disallowed ..	3,891 1 11	3,891 1 11	b. do. Propaganda ..	91,468 9 2	91,468 9 2
Receipts from the Cotton Fund ..	27,89,782 0 0		c. do. Writing-up ..	2,315 3 0	2,315 3 0
Less :-Amount re-funded ..	36,366 0 0		(3) a. Dharwar wilt ..	1,82,886 4 11	1,82,886 4 11
expense receipts ..	703 3 6	703 3 6	b. do. Writing-up ..	10,902 10 3	10,902 10 3
			(4) Khandesh ..	26,573 5 0	26,573 5 0
			(5) Co-ordination of cotton research	1,749 7 6	1,749 7 6
			(6) Jalgaon cotton breeding ..	87,324 9 2	4,716 4 0
			(7) Broach cotton breeding ..	1,25,314 0 2	92,040 13 2
			(8) Small leaf disease survey ..	2,988 9 6	7,949 10 0
			(9) Survey of Goghari cotton ..	4,199 5 0	1,32,668 10 2
			(10) Desfibration of cotton seed ..	4,878 5 9	5,298 9 6
			(11) Plant Puller propaganda ..	21,940 1 3	4,199 5 0
			(12) Breeding of wilt-resistant cotton for Surat area ..	36,417 0 0	4,878 5 9
			(13) Village projects for improvement of cultivation of crops.	1,081 5 4	21,940 1 3
			(14) Inclusion of Northern and Western in dry farming research at Bijapur ..	6,953 12 7	36,417 0 0
			(15) Poona wilt breeding ..	91,631 14 6	1,813 6 0
			(16) Improvement of cotton crop in Kaira district ..	14,655 13 6	2,894 11 4
			(17) Interspecific hybridisation at Surat ..	39,836 6 11	6,953 12 7
				49,604 14 4	97,702 5 6
				83,991 5 3	14,655 13 6
				11,18,020 8 4	
				71,864 9 4	
				171,416 2 1	
				61,02,518 1 5	
Carried over ..	2,04,56,252 4 1	27,53,416 0 0	Carried over		
		2,32,09,688 4 1			

RECEIPTS.

	Cotton Cess			Cotton Fund.			Total.	
	Rs.	a. p.	Rs.	a. p.	Rs.	a. p.	Rs.	a. p.
Brought forward ..	2,04,56,252	4	1	27,53,416	0	0	2,32,09,668	4 1

EXPENDITURE.

	Cotton Cess			Cotton Fund.			Total.	
	Rs.	a. p.	Rs.	a. p.	Rs.	a. p.	Rs.	a. p.
Brought forward ..	59,81,101	18 4	1,71,416	2 1	61,02,518	1 8		
(i) <i>Bombay</i> :—contd.								
(18) Improvement of Dholleras ..	11,18,020	8 0	71,864	9 4	11,89,885	1 4		
Wagad cotton at Viramgaon and Bavla ..	64,205	1 2	7,115	12 8	71,320	13 6		
(19) Improvement of Dharwar-American cotton ..	14,804	3 3	8,976	11 9	23,779	15 0		
(20) Co-ordinated crop weather scheme ..	..	..	12,430	15 0	12,430	15 0		
Total ..	11,96,520	12 5	1,00,887	0 4	12,96,916	12 9		

(ii) *Madras* :—

(1) Herbaceum ..	..	..	1,42,466	13 1	1,42,466	13 1		
(2) Pemphres & Physiological.	..	..	2,01,084	15 9	2,01,084	15 9		
(3) Fodder cholam ..	..	..	19,517	9 4	19,517	9 4		
(4) Breeding of Nadam cotton ..	..	..	17,727	2 6	17,727	2 6		
(5) Improvement of Mungari cotton	..	..	71,442	2 1	4,722	76,164	8 1	
(6) Investigation of the possibilities of control of cotton steam weevil ..	..	..	6,165	7 6	6,165	7 6		
(7) Improvement of Ocanadas cotton ..	..	..	41,938	4 4	46,876	13 6	88,815	1 10
(8) Scheme for production of long staple cotton ..	..	..	..	..	18,443	14 0	18,443	14 0
(9) Breeding of Cambodia cotton in Ceded districts ..	..	..	..	..	51,068	8 9	51,068	8 9
Total ..	5,00,292	6 7	1,21,111	10 3	6,21,404	0 10		

(iii) *Punjab* :—

(1) Botanical ..	..	..	6,81,171	2 7	6,81,171	2 7		
(2) Entomological ..	..	..	2,25,908	7 11	2,25,908	7 11		

(3) White Fly	48,721	4	1	48,721	4	1
(4) Root Rot	71,048	10	10	71,048	10	10
(5) Spraying trials	9,977	9	6	9,977	9	6
(6) Dedfration & Delinting	6,112	8	9	6,112	8	9
(7) Survey of disease of malformation	1,730	10	6	1,730	10	6
(8) Physiological	4,09,492	0	4	4,09,492	0	4
(9) Clean-up Campaign of Spotted Boll-worm	60,025	9	3	60,025	9	3
(10) Jassid Investigation	21,868	12	3	21,868	12	3
(11) Improvement of Punjab-American 289F	20,509	12	3	20,509	12	3
(12) Improvement of cotton in Jhang district .. .. .	....			13,146	2	0
(13) Improvement of cotton in South Eastern districts .. .. .	....			30,559	2	0
(14) Improvement of cotton in Lower Bari Doab Canal Colony .. .. .	....			14,335	15	0
(15) Improvement of cotton in South Western districts .. .. .	....			10,773	9	0
Total ..	15,56,565	15	3	68,814	12	0
				16,25,380	11	3

(iv) *Central Provinces & Berar* :-

(1) Botanical	4,93,449	9	4	4,93,449	9	4
(2) Entomological	12,344	13	6	12,344	13	6
(3) Investigation of Heliothis obsoleta	1,672	9	9	1,672	9	9
(4) C. P. & Berar cotton breeding scheme	49,261	8	9	47,029	8	0
(5) Village Projects for extension of improvements in cultivation of crops	2,297	10	0	997	13	0
				3,295	7	0
Total ..	5,59,026	3	4	48,027	5	0
Carried over	81,68,248	4	3	4,38,492	4	4
				86,06,740	8	7

Carried over .. 2,04,56,252 4 1 27,53,416 0 0 2,32,09,688 4 1

Balance Sheet as at 31st March, 1948.—(contd.)

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RECEIPTS.

Cotton Cess.	Cotton Fund.		Total.
	Rs.	a. p.	Rs. a. p.
Brought forward ..	2,04,50,252	4 1	27,53,416 0 0 2,32,09,688 4 1

EXPENDITURE.

	Cotton Cess.		Cotton Fund.		Total.
	Rs.	a. p.	Rs.	a. p.	Rs. a. p.
Brought forward ..	81,68,248	4 3	4,38,492	4 4	86,06,740 8 7
(v) United Provinces :—					
(1) Pink Bollworm ..	1,46,616	2 10			1,46,616 2 10
(2) Rohilkhand and Bundelkhand survey ..	18,061	14 4			18,061 14 4
(3) Village Projects for extension of improvements in cultivation of crops ..	3,125	5 3			3,125 5 3
(4) Botanical ..	84,247	15 0	9,741	0 0	93,988 15 0
(5) Scheme for hybridisation in arboreum cottons ..	....		13,365	9 0	13,365 9 0
Total ..	2,52,051	5 5	23,106	9 0	2,75,157 14 5

(vi) Indore :—

(1) Institute of Plant Industry ..	19,86,943	12 0	2,61,060	0 6	22,48,003 12 6
(2) Cotton Genetics Research Scheme ..	2,52,538	4 11			2,52,538 4 11
(3) Cotton Physiological Research Scheme ..	....		2,14,461	14 9	2,14,461 14 9
Total ..	22,39,483	0 11	4,75,521	15 8	27,15,004 0 2

(vii) Sind :—

(1) Physiological ..	2,63,945	12 10			2,63,945 12 10
(2) Jassid investigation ..	15,468	13 6			15,468 13 6
(3) Black-headed Cricket ..	9,245	1 3			9,245 1 3
(4) Production of long staple cotton ..	1,34,619	13 10	94,991	12 11	2,29,611 10 9
(5) Bollworm investigation and clean-up campaign ..	65,132	15 9	42,107	0 0	1,07,239 15 9

(6) Manurial trials in Sind

	....	9,062 15 0	9,062 15 0
Total ..	4,88,412 9 2	1,47,061 11 11	6,35,474 5 1

(viii) *Burma* :—

(1) Capital Expenditure ..	2,906 15 5	2,906 15 5
(2) Cotton Improvement ..	47,790 3 9	47,790 3 9
Total ..	50,697 3 2	50,697 3 2

(ix) *Hyderabad* :—

(1) Botanical	4,20,278 8 8	4,20,278 8 8
(2) Cotton Survey	36,578 3 6	36,578 3 6
(3) Pink & Spotted Bollworm ..	83,976 10 4	83,976 10 4
(4) Improvement of Kumpta cotton	76,253 1 10	76,253 1 10
(5) Inclusion of Northern & Westerns in Dry Farming Scheme at Balchur ..	2,000 4 0	2,000 4 0
(6) Pink & Spotted Bollworm Clean-up Campaign	53,950 8 0	53,950 8 0
(7) Improvement of cottons of the Omrae tract	71,321 6 1	7,417 10 0
(8) Gaorani Improvement Scheme	849 0 0	64,652 3 3
Total ..	7,43,509 10 5	72,069 13 3

(x) *Bikaner* :—

Bengals Cotton Improvement Scheme	70,377 10 11	70,377 10 11
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(xi) *Baroda* :—

(1) Root Rot	92,335 12 9	92,335 12 9
(2) Comparative tests	4,251 5 3	4,251 5 3
(3) Survey of Goghari cotton ..	3,891 14 7	3,891 14 7
(4) Plant Puller Propaganda ..	32,533 15 10	32,533 15 10
5) Mathio cotton at Amreli and Jagudan	57,451 7 5	57,451 7 5
Total ..	1,90,464 7 10	1,90,464 7 10
Carried over	1,22,03,243 4 1	11,56,252 5 9

Balance Sheet as at 31st March 1948.—(Contd.)

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RECEIPTS.

Cotton Cess.				Cotton Fund.		Total.	
Rs.	a. p.	Rs.	a. p.	Rs.	a. p.	Rs.	a. p.
Brought forward ..	2,04,56,262	4	1	27,53,416	0 0	2,32,09,683	4 1

EXPENDITURE.

Cotton Cess.				Cotton Fund.		Total.	
Rs.	a. p.	Rs.	a. p.	Rs.	a. p.	Rs.	a. p.
Brought forward ..	1,22,03,243	4	1	11,56,252	5 9	1,33,59,495	9 10

(xii) *Bengal* :—

(1) Comilla Scheme	43,686	13	7	43,686	13	7	
(2) Cultivation of long staple cotton	6,273	0	0	7,439	11	3	13,712 11 3
Total ..	49,959	13	7	7,439	11	3	57,399 8 10

(xiii) *Mysore* :—

Doddabathi Cotton	28,013	11	0	18,740	14	0	46,754 9 0
(xiv) Collection of Iran cotton	3,121	12	0				3,121 12 0
(xv) <i>Baluchistan</i> :—Coordination of Research on Black-headed Cricket in Sind & Baluchistan ..	22,608	5	5	17,173	1	0	39,781 6 5
((xvi) <i>Nawanagar</i> :—Preliminary scheme ..	323	12	4				323 12 4
(xvii) Estimation of effects on cotton crop of the use of plant Puller ..	4,143	12	5				4,143 1 5

(2) *SHED DISTRIBUTION & EXTENSION SCHEMES.*

(1) *Bombay* :—

(1) Hubli	44,048	8	3	44,048	8	3	
(2) Gadag	41,700	15	1	41,700	15	1	
(3) Gadag (Supplementary) ..	20,167	11	4	20,167	11	4	
(4) Surat	93,634	1	4	93,634	1	4	
(5) Athani	18,086	1	7	18,086	1	7	
(6) Khandesh (Banilla)	1,65,590	4	0	1,65,590	4	0	

(7) Khandesh (Jarilla)	2,45,621	1	3	8,787	4	0	2,52,408	5	3
(8) Deccan Canal (Banilla)	3,333	3	4				3,333	3	4
(9) B. D. 8	40,662	2	6				40,662	2	6
(10) Revised Jayawant & Gadag No. 1	2,32,623	4	11	6,824	2	8	2,39,447	7	7
(11) Maintenance of nucleus of pure seed of improved varieties of cotton	9,664	6	3				9,664	6	3
(12) Scheme for control of selection 1A cotton	4,965	10	0				4,965	10	0
(13) 1027 A. L. F. cotton in Nawapur Taluka	5,525	10	0	1,898	14	0	7,424	8	
(14) Scheme for multiplication of Vijaya cotton	81	1	0	36,813	11	0	36,894	12	0
(15) Wagotar cotton in Ahmedabad District	55	0	0	26,077	8	0	26,132	8	0
(16) Multiplication and Distribution of Suryog cotton .. ..	....			15,733	14	6	15,733	14	6
Total	9,23,749	0	10	96,135	6	2	10,19,894	7	0

(II) Madras :—

(1) Pay and allowances of Business Manager, Tiruppur	24,079	13	0				24,079	13	0
(2) Co.2	41,286	2	9				41,286	2	9
(3) H.1	41,070	3	9				41,070	3	9
(4) Maintenance of nucleus of pure seed of improved varieties of cotton	2,715	2	5	5,635	13	9	8,351	0	2
(5) Co.3 in Salem District	55,902	6	0	....			55,902	6	0
(6) Multiplication and Distribution of Karunganni cotton .. ..	....			10,168	13	0	10,168	13	0
Total	1,65,053	11	11	15,799	10	9	1,80,853	6	8

(III) Sind :—

(1) Seed distribution	4,15,730	15	10	21,374	11	0	4,37,105	10	10
Carried over: 1,38,15,948	4	2	13,32,895	11	11	1,51,48,844	0	1	

Carried over .. 2,04,56,252 4 1 27,53,416 0 0 2,32,09,638 4 1

Balance Sheet as at 31st March, 1948.—(contd.)

RECEIPTS.

Cotton Cess.	Cotton Fund.	Total.
Ra.	a. p.	Ra. a. p.
Brought forward.. 2,04,56,252	4 1 27,53,416	0 0 2,32,09,668

EXPENDITURE.

	Cotton Cess.	Cotton Fund.	Total.
	Ra. a. p.	Ra. a. p.	Ra. a. p.
Brought forward ..	1,33,15,943	4 2 13,42,895	11 11 1,51,48,844
(iii) Sind :—(contd.)			
(2) Maintenance of nucleus of pure seed of improved varieties of cotton	9,862	13 5	....
(3) Financing of seed distribution	1,08,965	12 0	29,404
Total ..	5,34,559	9 3	50,779
(iv) Hyderabad—Seed Scheme	51,307	13 3	51,307

(v) Central Provinces & Berar :—

(1) Maintenance of nucleus of pure seed of improved varieties of cotton	3,260	7 6	3,260
(2) Jarilla seed distribution scheme	1,716	4 0	2,104
Total ..	4,976	11 6	2,104

(vi) Baroda :—

(1) Narsari seed scheme	34,585	1 4	3,962	8 0	33,497
(2) B. D. 8	17,642	5 9			17,042
(3) B. 9	20,441	9 2			20,441
(4) Scheme for creation of a pure Wagad cotton zone in Mehsana district .. ..	....				10,393
(5) Vijaya scheme .. ..	....				1,11,337
(6) Suyog cotton scheme .. ..	....				49,872
(7) Wagotar Cotton Scheme	—55	0 0	11,162	12 0	11,107
Total ..	72,564	0 3	1,86,728	7 0	2,59,393

(vii) *Lydelpur*—Ginnery 16,088 3 3 16,088 3 3

(viii) *United Provinces* :—

(1) C.402	18,616 11 6	18,616 11 6
(2) Perso-American cotton in Western districts ..	59,147 10 0	59,147 10 0
Total ..	77,764 5 6	77,764 5 6

(ix) *Mysore* :—

Multiplication and distribution of Selection 69 M. A. V.	1,374 15 0	1,374 15 0
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(3) *MARKETING SCHEMES.*

(1) Grading and marking of 1027 A. L. F. in Surat area ..	7,467 10 3	11,166 0 0	18,633 10 3
(2) Punjab cotton marketing survey	7,214 1 6	....	7,214 1 6
(3) <i>Baroda</i> : Better marketing of 1027 A. L. F. ..	15,082 0 10	....	15,082 0 10
(4) Extension and marketing of V.434 in Central Provinces .	3,61,562 5 4	3,417 0 0	3,64,979 5 4
(5) Distribution and marketing of Furi 107 cotton in Burhanpur Tahsil ..	24,429 0 0	....	24,429 0 0
(6) Distribution and marketing of Jarla cotton ..	—1,105 5 0	22,819 5 6	21,714 0 6
Total ..	4,14,599 12 11	37,402 5 6	4,52,002 2 5

(4) *MISCELLANEOUS SCHEMES.*

(1) Compilation of manual trials	719 15 0	....	719 15 0
(2) Compilation of handbook dealing with pests and diseases of cotton in the Empire ..	2,975 5 0	....	2,975 5 0
(3) Survey of nutritional values in relation to milch buffaloes of fuzzy cotton seed and cotton seed cakes manufactured from such seeds ..	7,345 5 11	....	7,345 5 11
Total ..	11,040 9 11	....	11,040 9 11
Carried over ..	1,94,75,054 4 0	15,39,930 4 5	2,10,64,984 8 6

Balance Sheet as at 31st March, 1948.—(contd.)

RECEIPTS.

	Cotton Cess.			Cotton Fund.			Total.		
	Rs.	a.	p.	Rs.	a.	p.	Rs.	a.	p.
Brought forward	04,56,252	4	1	27,53,416	0	0	2,32,09,688	4	0

EXPENDITURE.

	Cotton Cess.			Cotton Fund.			Total.		
	Rs.	a.	p.	Rs.	a.	p.	Rs.	a.	p.
Brought forward	1,94,75,054	4	0	15,89,930	4	5	2,10,64,984	8	5

III. TECHNOLOGICAL RESEARCH.

(1) Technological Laboratory :—

(a) Capital Expenditure :—

(1) Land & Buildings	..	..	4,07,988	14	6	....	4,07,988	14	6
(2) Machinery	..	..	1,23,212	1	2	....	1,23,212	1	2
(3) Freight	..	..	7,502	2	8	....	7,502	2	8
(4) Apparatus & Equipment	..	..	40,365	15	7	1,302	6	0	41,668
(5) Machinery & Workshop	..	..	7,091	14	3	....	7,091	14	3
(b) Working Expenses	..	..	38,58,214	10	2	....	38,58,214	10	2
(2) Provincial	..	..	3,54,747	3	0	....	3,54,747	3	0
(3) Development of alternative uses of Indian cotton	..	..	58,056	12	11	....	58,056	12	11

(4) Investigation for Improvement in the ginning of Indian cotton

(a) Capital Expenditure	..	..	34,072	13	9	....	34,072	13	9
(Working Expenses	..	..	12,920	10	0	29,573	8	6	42,494
(5) Research on chemical finishes on short staple cotton yarn and fabrics	..	..	....	..	..	9,360	0	0	9,360
(6) Scheme for conducting experiments on storage of cotton lint	..	..	1,146	10	3	24,389	1	9	25,435

Total .. 49,06,319 12 3 64,575 0 3 49,69,894 12 6

IV. RESEARCH STUDENTSHIPS.				2,82,566	1	4	....	2,82,566	1	4
Less :—Refunds from Dr. Tashkir										
Ahmad				—3,843	10	0	....	—3,843	10	0
Total ..				2,78,722	7	4	....	2,78,722	7	4
By Suspense account				31,282	6	2	....	31,282	6	2
By Balance				6,57,859	4	2	10,98,910	11	4	17,56,769
									15	6

GRAND TOTAL	..	2,04,56,252	1	27,53,416	0	0	2,32,09,688	4	1	
GRAND TOTAL	..	2,04,56,252	4	1	27,53,416	0	0	2,32,09,688	4	1

Balance Sheet as at 31st March, 1948.

Provident Fund Account.

RECEIPTS.			EXPENDITURE.		
	Rs.	a. p.	Rs.	a. p.	a. p.
Subscribers' Contribution account	..	3,36,517 3 9	By advance to subscribers	..	1,73,656 4 0
Less :—Payments made to subscribers resigned	3,18,406 11 11	Less :—Recoveries made	..	1,44,570 6 0
		<u>3,18,110 7 10</u>	Interest accrued on Government paper up to 31-3-1948	..	196 0 0
Committee's contribution account	..	6,22,490 13 10	By Balance	..	6,82,911 3 2
Less :—Payments made to Subscribers resigned and forfeitures for Committee's contributions disallowed	..	3,09,642 3 7			
		<u>3,12,848 10 3</u>			
Lapse and Forfeiture account (including profit on securities sold)	..	69,514 3 5			
Investment Fluctuations account	..	3,017 1 0			
		<u>72,531 4 5</u>			
Interest account	..	8,872 2 8			
Less :—Payments made to subscribers resigned	..	1,624 3 0			
		<u>7,247 15 8</u>			
Suspense account	..	1,454 11 0			
		<u>Total .. 7,12,193 1 2</u>			
			Total	..	7,12,193 1 2

APPENDIX V.

STOCKS OF INDIAN COTTON ON 31ST JANUARY, 1948, HELD BY THE MILLS AND
THE TRADE IN MADRAS PROVINCE.

(In thousand bales of 400 lbs. each.)

Trade descriptions of cotton.	MILL STOCKS ON 31ST JANUARY					TRADE STOCKS ON 31ST JANUARY					TOTAL STOCKS ON 31ST JANUARY				
	1944.	1945.	1946	1947.	1948.	1944.	1945.	1946.	1947.	1948.	1944.	1945.	1946.	1947.	1948.
	1944.	1945.	1946	1947.	1948.	1944.	1945.	1946.	1947.	1948.	1944.	1945.	1946.	1947.	1948.
Tinnevelles ..	17	37	32	47	33	18	23	8	31	8	35	60	40	78	41
Salems ..	19	..	.	..	..	4	6	5	..	2	23	6	5	..	2
Cambodias ..	83	83	58	126	76	49	70	15	31	34	132	153	73	157	110
Northerns & Westerns ..	15	19	25	18	23	26	13	94	77	21	41	32	119	95	44
Cocanadas ..	3	1	5	1	2	19	19	20	2	12	22	20	25	3	14
Outside Cottons..	84	66	84	80	64	5	2	1	3	2	89	68	85	83	66
Total ..	221	206	204	272	198	121	133	143	144	79	342	339	347	416	277

APPENDIX VI.

INDIAN RAW COTTON CONSUMED IN INDIAN MILLS

(Based on returns made under the Indian Cotton Cess Act, 1923, by mills in British India,* and on voluntary returns from mills in Indian States.)

Cotton Year: 1st September to 31st August

(In bales of 400 lbs. nett.)

	1933-34.	1934-35.	1935-36.	†1936-37.	1937-38.	1938-39.	1939-40.	1940-41.	1941-42.	1942-43.	1943-44.	1944-45.	1945-46.	1946-47.	1947-48.‡
Bombay Island ..	491,709	687,287	664,199	636,720	782,815	750,317	684,149	987,084	1,067,745	1,270,766	1,199,172	12,23,679	1,124,072	8,42,024	1,006,279
Ahmedabad ..	373,345	328,558	320,982	304,398	346,269	346,375	305,459	341,800	414,870	364,999	428,677	401,544	383,274	296,380	390,066
Bombay Province ..	1,063,549	12,30,616	1,189,310	1,128,744	13,53,998	1,316,313	1,172,285	1,580,079	1,764,339	1,939,423	1,906,606	1,910,619	1,769,233	13,65,760	1,644,408
Madras Province ..	278,060	312,164	365,423	412,268	422,573	480,889	507,391	525,611	594,054	647,407	596,686	603,796	566,173	455,330	508,265
United Provinces ..	277,230	292,424	317,011	299,073	288,820	356,331	349,340	381,025	427,305	437,441	414,210	410,596	369,018	299,566	343,137
Central Provinces and Berar.	112,660	125,014	130,298	122,987	146,587	164,616	142,868	153,855	178,791	174,385	148,020	169,727	156,116	142,573	158,743
Bengal * ..	107,633	101,101	98,892	79,944	92,546	90,611	111,383	135,227	125,740	136,098	188,203	135,697	128,731	100,796	111,379
The Punjab and Delhi*	71,839	83,897	89,480	93,886	94,742	133,347	165,274	171,652	179,987	182,104	184,960	181,384	167,948	143,986	90,117
Rest of British India*	35,139	38,575	38,010	35,323	46,340	49,806	44,867	47,316	64,804	59,003	52,242	52,291	53,894	49,809	47,055
Total—British India*	1,946,210	2,183,791	2,228,374	2,172,725	2,445,606	2,591,863	2,493,408	2,994,735	3,335,020	3,575,861	3,440,816	3,464,110	3,211,163	2,557,769	2,903,053
Total—Indian States	390,116	428,341	449,314	460,060	554,003	559,202	556,698	622,412	690,375	730,970	678,646	694,554	659,859	593,093	670,154
TOTAL-INDIA ..	2,336,326	2,612,132	2,677,688	2,632,785	2,999,609	3,151,065	3,050,106	3,617,147	4,025,395	4,306,831	4,119,461	4,158,664	3,871,022	3,150,862	3,573,207

† From April 1937, figures for Burma have been excluded.

N. B.—From 15th August 1947, figures for Pakistan have been excluded.

* Relates only to Governor's and Chief Commissioner's Provinces of the Dominion of India from the 16th August, 1947.

‡ In bales of 392 lbs. nett.

INDIAN RAW COTTON CONSUMED IN MILLS IN INDIAN STATES.

(Based on voluntary returns from mills in Indian States).

Cotton Year 1st September to 31st August.

(In bales of 400 lbs. nett.)

	1933-34	1934-35	1935-36	1936-37	1937-38	1938-39	1939-40	1940-41	1941-42	1942-43	1943-44	1944-45	1945-46	1946-47	1947-48.†
Hyderabad	33,231	45,588	51,771	49,981	63,093	68,156	67,995	72,860	83,725	83,639	78,304	71,640	67,453	53,040	70,993
Mysore	47,168	51,196	50,824	53,236	55,244	53,868	67,951	65,062	74,966	77,784	57,718	73,688	70,073	71,801	68,431
Baroda	53,612	57,146	51,963	51,761	70,686	73,278	65,573	91,519	90,642	87,542	86,028	81,964	81,845	54,249	78,237
Gwalior	49,362	56,318	72,163	79,079	89,243	94,090	88,688	95,517	94,300	90,025	93,152	87,485	78,709	70,376	78,844
Indore	111,430	114,229	113,379	106,454	147,766	140,792	129,186	138,795	148,867	149,914	144,147	154,429	141,953	137,308	141,938
Kathiawar States	28,508	35,438	37,397	42,717	48,545	44,109	43,703	50,479	60,628	72,857	70,577	71,184	69,292	61,128	68,091
Other Indian States	45,197	45,735	51,462	57,767	58,444	58,444	102,702	108,180	137,247	169,209	148,219	154,164	141,529	146,293	160,087
Pondicherry	23,610	22,691	20,355	19,065	22,307	20,475									
Total—Indian States	390,116	428,341	449,314	460,060	554,093	559,292	556,698	622,412	690,375	730,970	6,78,645	694,554	659,859	5,93,093	670,111

LOOSE (UNPRESSED) INDIAN RAW COTTON RECEIVED† IN MILLS IN BRITISH INDIA††

(Based on voluntary returns furnished by mills).

Cotton year 1st September to 31st August.

(In bales of 400 lbs. nett.)

	1933-34	1934-35	1935-36	1936-37	1937-38	1938-39	1939-40	1940-41	1941-42	1942-43	1943-44	1944-45	1945-46	1946-47	1947-48.‡
Bombay Province	74,863	53,355	75,617	67,219	74,750	80,164	86,687	96,215	102,965	81,649	54,415	33,072	25,012	19,743	13,461
Madras Province	110,875	123,260	147,044	173,104	156,675	169,489	175,540	189,257	230,601	211,751	202,405	208,800	190,379	139,710	132,040
United Provinces	17,871	10,090	10,405	10,659	15,719	17,532	20,279	29,127	24,293	15,924	4,087	3,893	1,123	590	6,726
Central Provinces and Berar	18,382	20,544	27,502	26,321	32,860	24,980	29,052	32,580	31,178	19,133	7,866	3,893	6,639	3,777	2,506
Bengal				90											
The Punjab and Delhi †		5,535	3,110	28,325	23,873	25,960	33,079	28,697	30,986	22,433	5,009	6,017	4,337	7,853	2,506
Rest of British India *				19,282	17,160	22,910	12,734	16,329	21,280	6,804	15,819	16,908	13,054	7,369	6,567
Total—British India	221,996	217,784	263,678	325,058	321,937	336,041	357,374	391,344	443,393	377,496	293,534	276,424	235,385	182,005	165,991
Indian States *				131,149	109,093	122,078	116,962	131,697	118,660	83,372	78,582	59,809	47,204	41,644	54,121
Total—INDIA *				456,207	430,040	458,119	474,336	523,001	562,053	460,868	372,416	336,233	282,589	223,649	220,112

* Figures up to 1935-36 not compiled

† Figures up to 1935-36 exclude Delhi.

‡ From 1936-37 the figures refer to consumption and not receipts and are based on returns furnished under the Indian Cotton Cess Act, 1923 by mills in British India and on voluntary returns from mills in India States. From April 1937 figures for Burma have been excluded

N. B.—Excludes Pakistan from the 15th August 1947 †† Relates only to Governor's and Chief Commissioner's Provinces of the Dominion of India from the 15th August, 1947.

‡ In bales of 392 lbs. net

**TWENTY-EIGHTH
ANNUAL REPORT**

**INDIAN
CENTRAL COTTON COMMITTEE**

for the year ended
31st AUGUST,
1949.

PRICE Rs. 2.

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INDIAN CENTRAL COTTON COMMITTEE ANNUAL REPORT.

CHAPTER I.

GENERAL.

THE Indian Central Cotton Committee was established by the Government of India in 1921, in pursuance of the recommendations of the Indian Cotton Committee of 1917-18, and this is its twenty-eighth Annual Report covering the period 1st September, 1948 to 31st August, 1949. At first, the Committee was purely a technical advisory body to Government on matters connected with cotton. In 1923, however, it was incorporated under the Indian Cotton Cess Act and provided with separate funds to enable it to undertake work for the improvement of the growing, marketing and manufacture of Indian cotton. These funds are derived from the levy of a cess on all cottons consumed in mills in India or exported from Indian ports. For the first three years after the passing of the Act, the cess was collected at the rate of annas four on every bale of Indian cotton consumed in Indian mills or exported and, thereafter, at the rate of annas two. Subsequently, as a result of the war and the consequent decline in exports, receipts from the cess dropped considerably and it became necessary for the Committee to fall back on its accumulated funds in order to finance its activities. The income of the Committee was further reduced by the partition of the country on 15th August, 1947. Due to the constitution of Pakistan as an independent country, the cess on exports of cotton from Pakistan as also on cotton consumed in Pakistan mills was lost to the Committee. This loss of income was made up to some extent by grants given by the Government of India from the Cotton Fund built up from the proceeds of the levy of an additional duty of one anna per lb. on all imports

of raw cotton. However, it was felt essential that the Committee should be assured of a more regular income to enable it to carry out its future work and policy effectively. Accordingly by two successive amendments of the Indian Cotton Cess Act in 1947 and 1948, the cess was made leviable on all cotton consumed in Indian mills or exported from India with effect from 15th August, 1947, and the rate of the cess was raised from two annas per bale to four annas per bale from 10th September, 1948. The idea from the very beginning was that the Indian Central Cotton Committee should form a common meeting ground for representations of all sections of the cotton industry and the Agricultural Departments of all the cotton growing States in India, at which the cotton problems of the country would be discussed and measures suggested for tackling them. It was realised from the outset that the cultivators' interests must be paramount in all matters considered and decided on by the Committee and that no permanent developments could take place unless they were in his interests.

The first task of the Committee was to arrange for a well-directed co-ordinated effort for the improvement of every aspect of cotton in India, including the improvement of the race of the plant by scientific plant breeding. Grants were made to Departments of Agriculture in the various cotton growing States for specific investigations on cotton, in which improvement of the variety was naturally given high priority. The policy in the main has been to supplement and not to supplant the work of the State Departments of Agriculture, and though, as a matter of convenience, certain lines of demarcation have been laid down regarding the investigations which the Committee considers most appropriate for its grants, assistance, as a general rule, is given in the directions where it is most needed.

Under the Indian Cotton Cess Rules, members, other than **ex-officio** members, hold office for three years and one-third of their number retire each year in rotation. The term of office of additional members appointed by the Governor-General under Section 4 (x) of the Indian Cotton Cess Act is three years or such lesser period as may be specified in the notification appointing them. A list of members constituting the Committee indicating the various interests they represent, as on the 31st August, 1949, is given in Appendix I. The composition of the various Sub-Committees of the Committee as on the 31st August, 1949, is shown in Appendix II. The functions of these Sub-Committees have been detailed in earlier reports of the Committee.

The post of Secretary of the Committee was held by Shri Kalidas Sawhney and that of Assistant Secretary by Mr. C. J. Bocarro, except for the periods from the 6th October 1948 to the 26th November 1948 and from the 3rd June 1949 to the 31st August 1949, during which Mr. Bocarro was on leave, and Shri Ajodhya Sahai, Superintendent of the office, officiated for him.

The total receipts of the Committee up to the 31st March, 1949, since its inception amounted to Rs. 2,69,33,137-14-5 of which Rs. 2,11,79,721-14-5 represent collections from the Cotton Cess and the remainder, miscellaneous receipts and special grants from the Government of India. The receipts during the year amounted to Rs. 37,24,172-13-9 and the total expenditure to Rs. 12,34,078-3-10. A statement of receipts and expenditure for the year as at 31st March, 1949, is contained in Appendix III.

Sardar Datar Singh (President), Shri R. G. Saraiya, (Vice-President), Shri Chunilal B. Mehta, Dr. B. N. Uppal, Shri Chimanlal B. Parikh, Shri P. S. Patil and the Secretary represented the Committee on the Board of Governors of the Institute of Plant Industry, Indore, during the financial year ending 31st March, 1949. During the same period, Shri Chunilal B. Mehta represented the Committee on the Indian Council of Agricultural Research. Under Article 51 of the Articles of Association of the East India Cotton Association, the Indian Central Cotton Committee is entitled to nominate from amongst its growers' representatives, three persons, whether members of the Association or not, not having dealings in forward contracts, as Directors of the Association. Shri S. K. Wankhede, Shri F. B. Loxmeshwar and Raje J. R. Deshmukh were elected as the Committee's representatives on the Board of Directors of the Association for the cotton year 1948-49.

Two meetings of the Indian Central Cotton Committee were held in the year under report at both of which Sardar Datar Singh, President of the Committee and Vice-Chairman of the Indian Council of Agricultural Research, presided. The first meeting was held at Bombay on the 24th and 25th September, 1948.

The most important subject considered at this meeting was the position arising out of the fixation of Floor and Ceiling prices of cotton by the Government of India for the 1948-49 season. After a lengthy discussion, the Committee unanimously adopted the following resolution which was proposed by Shri Chunilal B. Mehta :—

RESOLUTION :—

“Resolved that a representation be submitted to the Government of India drawing their attention to the harmful effects on the cotton growing industry qualitatively and quantitatively of their raw cotton policy recently adopted by fixing low floor and ceiling prices for cotton and low differentials for the medium and long staple varieties for the seasons 1947-48 and 1948-49.”

This Resolution was duly communicated to the Government of India.

The 2nd meeting of the Indian Central Cotton Committee was held in February 1949. At this meeting the subject of cotton policy of the Government of India was further considered and after an extended discussion the following resolution moved by Shri Chunilal B. Mehta was passed by the Committee :—

“This meeting of the Indian Central Cotton Committee expresses its concern at the cotton policy adopted by the Government of India. Besides fixing lower prices for all cotton, the differentials allowed by them for medium and long staple varieties are such as would result in nullifying the many years’ work of this Committee for improving the class and staple of different cottons.

While the Indian Central Cotton Committee fully appreciates the need for increasing the production of food crops, it strongly feels that the need for increasing the production of cotton in the Indian Dominion is equally great.

The Committee, therefore, strongly recommends that the Government of India should carefully consider the problem of increasing the production of cotton by diverting as much acreage to cotton as possible and also revise the floors, ceilings and the differentials to such a level as would induce the cultivators to extend the growing of improved varieties.”

The Resolution was communicated to the Government of India.

In this connection, Shri R. G. Saraiya, the Vice-President of the Committee moved the following resolution which was unanimously adopted by the Committee.

RESOLUTION -

“In the structure of floor and ceiling prices special high differentials should be allowed for special varieties of cotton sponsored by the Indian Central Cotton Committee and/or the Provincial Departments of Agriculture.

In the formula for determination of the price of cloth the same consideration and allowance should be made in the price of cloth if Indian cotton is used for the manufacture of cloth with the same specifications as is allowed if foreign cotton is used.”

The question of the acreage that should be put to cotton in the Dominion of India during 1948-49 was considered by the Committee at its meeting in March 1948 and a recommendation was made, *inter alia*, to the Government of India that the area under cotton should be increased by 4.0 million acres during 1948-49. In order to meet the deficit, the Sub-Committee also suggested the following measures which were endorsed by the Committee :—

- (i) The acreage diverted from cotton should be brought back under cotton as recommended by the Committee. In this connection, it may be pointed out that cotton is not only an industrial raw commodity but is also a food crop inasmuch as cotton seed, which is an important item of animal food, is available in double the quantity of lint produced.
- (ii) Intensive work should be undertaken immediately to extend the areas under improved cottons in the new areas in the different States' Unions, such as Madhya Bharat, United State of Rajasthan, Patiala and East Punjab States' Union, etc.
- (iii) The Sub-Committee has been informed by various officers from different Provinces that the present prices of cotton are so low in comparison with the price of foodgrains and groundnut that the cotton acreage, instead of going up, was likely to go down. It was, therefore, necessary that the basic prices for cotton should be revised and raised to an economic level so as to induce the cotton cultivators not only to keep up the present cotton acreage but to increase it.
- (iv) Further, the Sub-Committee was strongly of the opinion that the present differentials are so low that they are tending to nullify the whole work which the Indian Central Cotton Committee has done in the past so many years for the improvement of cotton at a substantial cost. The present differentials are such that the cultivators are encouraged to divert their land from medium and long staple cotton to short staple cotton, as the cost of growing the latter is much less. The Sub-Committee further felt that no amount of legislation and efficiency can prevent mixing of short staple cotton with medium and

long staple ones as long as the economic attractions are so great as at present. The Sub-Committee, therefore, strongly recommended that the differentials should be brought to such a level so as not only to maintain their interest but to give an impetus to the cotton cultivators to grow medium and long staple cottons.

- (v) The Sub-Committee also recommended that fertilisers and manures should be made available to the cotton growing areas wherever suitable at such economic prices as would induce the cultivators to utilise the same."
-

CHAPTER II

COTTON STATISTICS.

DURING the year under report which is the second since the partition of the country, the area under cotton in the Indian Union was estimated at 11,055,000 acres against 10,655,000 acres in the previous year and 20,972,000 acres on the average of the three years ending 1938-39. The total estimated production was 1,864,000 bales against 2,188,000 bales (revised) in the previous year. The decline in the yield which was about 14.8% occurred mainly in the States of Bombay, Baroda and Madhya Pradesh. In Bombay State, the decline is attributed to inadequate soil moisture and defective opening of bolls. In Baroda, which is now merged in Bombay State, the decrease is reported to be due to the reduction of crop area caused by the complete failure of the 1948 monsoon, while in Madhya Pradesh, excessive and untimely rains in November, 1948, are said to have caused considerable damage to the crop.

INDIAN COTTON SITUATION, 1948-49.

On the opening day of the season under review, the September Contract stood at Rs. 503. The announcement by the Government of India of the schedule of floor and ceiling prices for new crop cotton of various descriptions for the season 1948-49 upset sentiment as the ceilings of many of the individual varieties, especially of the staple ones, were very low. As it was not made clear whether the floors and ceilings would apply to the contracts for September delivery, the market declined to Rs. 497 on the 2nd September. However, in view of the strong statistical position and the gloomy prospects for the new crop, prices soon firmed up. The Government's announcement to support the floor prices by purchasing cotton of the years 1947-48 and 1948-49, as well as of earlier seasons also imparted considerable confidence and on frantic short covering the Contract spurted up to Rs. 558 on the 9th September. The Textile Commissioner announced on the 11th September that prices payable under "ready" and "delivery" contracts entered into before 1st September, 1948, relating to cotton of 1947-48 or earlier seasons would be the prices agreed upon in the contracts and such contracts would not be affected by the floor and ceiling prices announced on 1st September, 1948. As a result,

September delivery was further pushed up to Rs. 569. The Indian Cotton Contract was revised during the month, the basis being changed to Jarila Fine, 25/32" with a tolerance of 1/32" and the months of delivery reduced from five to four, viz., February, May, July and September.

Trading in new crop contracts for the season 1948-49 was permitted from the 15th September, 1948, subject to the floor and ceiling prices and terms and conditions of trading as set out by the Government of India, and on that date the February, 1949, Contract opened at a premium of Rs. 10 over September, 1948. The new contracts received good support and owing to considerable switching over operations from the September, 1948, Contract to the new deliveries, the difference between the old crop contract and February, 1949, widened the same day to Rs. 14. Scarcity of tenderable cotton coupled with the very low ceilings fixed by Government for staple varieties forced up the September delivery to Rs. 600 on the 23rd September, when February delivery was quoted at a discount of Rs. 16-12-0. In the absence of any fresh incentive, the market again receded to Rs. 585 and Rs. 583 for September, 1948, and February, 1949, deliveries, respectively, on the 25th September, when the September delivery matured at Rs. 592. On rumours about imports of large quantities of foreign cotton, February delivery declined to Rs. 578 on the 30th September but closed steady the same day at Rs. 580.

During October, 1948, the Market ruled firm due to the statistical strength of Indian cotton and on hopes of improved consumption in the coming months, local spinners being active buyers in view of the high prices ruling in upcountry centres. A good export demand for Bengals and Mathia was also reported. The Indian Cotton Contract, February delivery, opened at Rs. 580, but in the absence of fresh support and on rumours of larger imports of foreign cotton, prices receded to Rs. 575 on the 4th October. Subsequently, encouraged by the strong statistical position, reports of a smaller crop owing to adverse weather advices, and the broadening of the demand in the spot market, prices sharply rose to Rs. 589 $\frac{3}{4}$ on the 11th October. Due to uncertainties regarding cotton arrivals from Pakistan and the possible effects of the Indo-British negotiations, and business being much restricted, fluctuations were narrow, but active trade support and encouraging spot advices, when nearly all varieties fetched prices very near the ceilings fixed by Government, pushed up February, 1949, delivery to Rs. 602 $\frac{1}{2}$ on the 20th October. The announcement of the agreement between Pakistan and the Indian Union, whereby Pakistan

was reported to have undertaken to supply the full quota of 650,000 bales of cotton in exchange for 300,000 bales of cloth, coupled with the possibility of imports of cotton from Egypt and Africa had an adverse effect on the market and February, 1949, delivery declined to Rs. 594 on the 23rd October. Only two days later, the tight supply situation, coupled with poor arrivals of the new crop again lifted February delivery to Rs. 601½ on the 25th. February delivery closed steady on the 31st October, 1948, at Rs. 598½.

In the beginning of November, due to paucity of arrivals from upcountry centres, a firm undertone in the spot market, untimely rains in the Madhya Pradesh districts and meagre chances of any large imports from Pakistan, February delivery gradually advanced to Rs. 606½ from the opening rate of Rs. 598½. On rumours that the process of requisitioning cotton by Government had started on a small scale in upcountry centres, as the mills were unable to get their requirements at ceiling prices, the market declined slightly. In view, however, of the strong statistical position and on reports of considerable damage to the Dhollera crops in Ahmedabad district due to drought, the prices rose sharply. Subsequently, the bullish fervour subsided on the Government of India's announcement to the effect that Government were determined not to allow cotton prices to be forced up through hoarding and refusal to sell within ceiling prices, and that they would freely use their powers to requisition cotton whenever necessary. Later, on reports of damage to the standing crops due to the cyclone, prices again moved upwards, but were not sustained. On the 26th November, the Contract closed steady at Rs. 599½. There was no trading thereafter till the end of the month, pending the result of the deliberations by the Board of the East India Cotton Association regarding the prevailing situation in the market, arising out of the control imposed by Government on cotton prices.

During December, 1948, the market ruled firm, at the ceiling level, fluctuating within narrow limits, mainly due to the strong statistical position. Export demand was good for Deshi varieties. During January, 1949, the market was stagnant, the price of the near position having struck the ceiling and of the others not much below it. Shortage of supplies with growing demand from the mills pushed up prices with the result that May delivery reached the ceiling rate of Rs. 620 on the 21st January. Subsequently, the promulgation of the Bombay Cotton Licensing Order slightly affected prices upcountry and this fact coupled with the reported move for the removal of penalty for failure to

tender cotton against the Indian Cotton Contract, upset sentiment but on moderate support the market again crept up. The May delivery closed steady on the 29th January at Rs. 618½, the July delivery being quoted at a discount of Re. 1. There was no trading in the Indian Cotton Contract February delivery throughout February, 1949; the rate remained stuck up at the ceiling. The Contract matured on the 24th February at the ceiling rate and no tenders were made against it. The announcement that the Bombay Cotton Licensing Order, 1949, would come into force from the 1st March, requiring all persons who held cotton stocks, Indian or foreign, above 24 bales to take out licences with a view to keeping a check over the stocks of raw cotton and facilitating their requisitioning for equitable distribution to the mills, had little effect on the market.

During March, 1949, stagnant conditions continued to prevail in the Bombay Cotton Market as all contracts remained glued to the ceiling rate. Local spinners showed little interest, due to scarcity of desirable varieties. Export demand was negligible as the Government of India by a Press Note dated the 16th March, further prohibited exports even of the four hitherto permissible varieties of short staple cotton, except to hard currency countries.

Stagnant conditions persisted during April. There was much disappointment amongst cotton interests with the outcome of the deliberations of the Cotton Conference held at New Delhi on the 11th April, which decided, *inter alia*, that control on cotton should be continued as an anti-inflationary measure.

During May, 1949, business was at a standstill with all the contracts glued to the ceiling rate. The second tender month of the season, viz., May delivery, matured on the 25th May at that rate, again without any tenders made against the contract. Also the decision of the Food Conference in New Delhi postponing the question of fixing prices of foodgrains for the next season was taken as a bad omen, as the fixation of the prices of cotton for 1949-50 season depended on the levels of food prices. The announcement by the Government of India of their cotton policy for the season 1949-50 on the 18th May further made the position gloomy. In order to exercise control over cotton uniformly throughout the Dominion, the Constituent Assembly passed a Bill during that month for including raw cotton, both ginned and unginned, and cotton seed, in the list of essential commodities under the Essential Supplies (Temporary Powers) Act, 1946. Stagnant conditions continued to prevail in the Market during June, 1949. Local spinners were

anxious buyers of available lots but due to paucity of stocks, business was very much restricted. Export business also was practically at a standstill. Under the new exchange of commodities agreement reached during July, 1949, between India and Pakistan, India was allotted 450,000 bales of raw cotton during 1949-50 as against 650,000 bales during 1948-49, a minimum of 250,000 bales to be purchased by the 28th February, 1950, and the balance by the 31st August, 1950. Business in the forward market which was at a standstill since the first week of February was resumed on the 11th July with September delivery opening at Rs. 619. The downward movement gathered momentum and the price sharply dropped, owing chiefly to reports of release of tenderable cotton to the extent of 50,000 bales from Hyderabad and to the falling off in mill demand owing to mounting stocks of cloth, coupled with favourable rains all over the cotton growing areas. In view of the paucity of tenderable varieties and nervous short covering, the price was again lifted to Rs. 620 on the 20th July when trading was brought to a standstill. The contract for the third tender month of the season *viz.*, July, 1949, delivery, matured on the 25th July at the ceiling rate, without any tenders made against it. There was no fresh development during August, 1949. The trade was perturbed over reports that some mills were closing down, due to heavy accumulation of stocks of cloth. Also the trade awaited with suspense, Government's approval of the changes in the By-laws of the East India Cotton Association adopted by its Board of Directors as well as Government's permission to open trading in new crop contracts for 1949-50. When the season ended the last Indian Cotton Contract of the season *viz.*, September, 1949, delivery remained glued to the ceiling rate.

The statistical position of cotton in the Indian Union during 1948-49 was as under :—

	(In lakhs of bales.)			
	$\frac{7}{8}$ " and above.	Below $\frac{7}{8}$ " and above 11/16".	11/16" and below.	Total.
Estimated carry over on 1st September, 1948.—				
(a) <i>With mills.</i>				
1. Indian cotton	2.2	7.1	2.3	11.6
2. Pakistan Cotton	1.4	0.7	..	2.1
3. Other foreign cotton	2.0	..	..	2.0
(b) <i>With trade.</i>				
1. Indian cotton	0.5	8.6	4.6	13.7*
2. Pakistan cotton	0.5	0.2	..	0.7
3. Other foreign cotton	0.6	..	..	0.6
	7.2	16.6	6.9	30.7
Estimated actual crop in 1948-49 ..	4.5	11.5	7.0	23.0
Estimated receipts from Pakistan ..	2.8	0.6	..	3.4
Imports from other foreign countries ..	7.0	..	..	7.0
Total supply ..	21.5	28.7	13.9	64.1
Mill Consumption:—				
Indian cotton	5.5	20.7	5.0	31.2
Pakistan cotton.	2.8	1.3	..	4.1
Other foreign cotton	7.2	..	..	7.2
	15.5	22.0	5.0	42.5
Extra factory consumption .. ..	..	0.4	2.3	2.7
Exports .. ..	..	..	3.05	3.05
Total offtake ..	15.5	22.4	10.35	48.25
Estimated carryover at the end of the season:—				
(a) <i>with mills.</i>				
Indian cotton	1.7	5.1	1.6	8.4
Pakistan cotton	1.4	0.2	..	1.6
Other foreign cotton	2.6	..	..	2.6
(b) <i>with trade.</i>				
Indian cotton .. ..	..	1.0	1.95	2.95
Pakistan cotton	0.1	..	..	0.1
Other foreign cotton	0.2	..	..	0.2
	6.0	6.3	3.55	15.85

* Revised.

STAPLE LENGTH OF INDIAN COTTON.

The staple length classification adopted in the Committee's report on the staple length of the Indian cotton crop of each season published in Statistical Leaflet No. 1 was revised during 1947-48 Season in view of the marked changes that had taken place in the character of the crop since the classification was last revised in 1936. The following staple length groups were approved by the Committee for adoption in the leaflet :—

Superior long staple	..	..	1" and above.
Long staple	..	..	7/8" to 31/32".
Superior medium staple	..	..	13/16" and 27/32".
Medium staple	..	..	Below 13/16" and above 11/16".
Short staple	..	..	Below 11/16".

The classification which was also accepted by the Export Trade Controller and the Textile Commissioner, Bombay, was given effect to in Statistical Leaflet No. 1 for 1946-47.

According to the official forecast, issued during the season under review the cotton crop of the Indian Union during 1947-48 was estimated at 2,188,000 bales of 392 lbs. net. The proportion of the crop falling under each of the five staple length groups referred to above to the total formed 2.8%, 13.8%, 33.4%, 21.8% and 28.2%, the corresponding figures for the previous season being 5%, 15%, 28%, 21% and 31% respectively. As the official final estimate of the cotton crop for the 1948-49 season was not issued until the 31st August, 1949, the above report for that season could not be prepared during the year under review.

STATISTICS OF STOCKS OF COTTON HELD IN THE COUNTRY.

The statistics of stocks of cotton held by the mills on the 31st August each year are collected by the Committee from mills by direct enquiries on a voluntary basis. The figures of stocks held by the trade on the same date are obtained with the co-operation of State Governments and trade bodies. To make the statistics of trade stocks as complete as possible, the Committee recommended, in 1944, to the various State Governments the introduction of legislation for the purpose. In addition to the progress made in this direction

as reported in the last Annual Report, the Governments of Madras and Hyderabad have passed the required legislation during the year under review. The area of the census thus extends to the major part of the cotton growing area.

The statistics of stocks of cotton held by the mills and the trade, classified by varieties, on the 31st August, 1947, were published in Statistical Leaflet No. 2. Of the total mill stocks, viz., 1,488,000 bales, 33% were of long staple, 52% medium staple and 15% short staple. The corresponding percentages for the trade stocks of 1,808,000 bales were 17%, 60% and 23%, respectively.

As the cotton season of the Madras State is taken as the year ending 31st January, figures of stocks of cotton held in that State are collected annually on this date in addition to the figures relating to the 31st August.

To keep a check over raw cotton stocks so as to make it possible to requisition them for equitable distribution to mills, the Government of Bombay decided to license under the Bombay Cotton Licensing Order, 1949, all persons who hold stocks of cotton or with whom cotton is hypothecated or pledged in quantities exceeding 24 bales or *boras* of cotton. The conditions attached to the licence provide, *inter alia*, for fortnightly returns to be submitted to the licensing authority for each type of cotton held by the licensee. Madras, Uttar Pradesh, Hyderabad, and Saurashtra Governments also passed similar Orders. The Cotton Control Order, 1949, issued by the Textile Commissioner, Bombay, towards the end of the year under review empowers States Governments to call for fortnightly returns of stocks of cotton held by agencies other than spinning mills. Under these powers most of the major cotton growing States have instituted fortnightly returns of cotton stocks. It is hoped that before long complete and reliable statistics of stocks of cotton held in the country will be available periodically.

DEMAND FOR VARIOUS TYPES OF INDIAN COTTON.

Statistics relating to internal and export demand for the various types of Indian cotton are compiled from the information collected on a voluntary basis and are published in Statistical Leaflets Nos. 3 and 4. Such statistics are of great value to the trade and the industry and to those entrusted with the responsibility of shaping and directing the cotton policy of the country.

MILL CONSUMPTION.

By virtue of the Indian Cotton Cess (Amendment) Act, 1947, and consequent amendments made in the Indian Cotton Cess Rules, mills are required to furnish the figures of consumption of cotton under the three heads (i) Indian cotton, (ii) Pakistan cotton and (iii) other foreign cotton. Owing to non-receipt of the required information on the revised basis, the statements of cotton consumption could not be issued during the year under review. The figures for 1948-49 which were subsequently published indicate that consumption of Indian Union, Pakistan and other foreign cottons in 1948-49 was 31.5, 3.8 and 7.0 lakhs bales.

EXPORTS.

Exports of Indian cotton from the Indian Union during the season amounted to 3,05,000 bales, against 8,05,000 bales in 1947-48. Exports to the United Kingdom, the Continent, U.S.A., and other countries formed 8, 55, 7 and 30 percent of the total exports during 1948-49, the corresponding percentages for 1947-48 being 10, 45, 8 and 37 respectively.

STATISTICS OF COTTON PRESSED.

During the season under review, 1,535,000 bales of cotton were pressed in the Indian Union against 2,721,000 bales in 1947-48. The statistics for the season under review are incomplete owing to figures of cotton pressed in Madhya Bharat and some merged areas in Bombay State not being available.

UNPRESSED (LOOSE) COTTON STATISTICS.

The statistics of cotton pressed do not account for the whole of the Indian cotton crop as, apart from the quantity *viz* 270,000 bales, utilised for extra-factory consumption, chiefly in the form of hand ginned cotton, mills situated near cotton growing areas often use considerable quantities of unpressed ginned cotton. During the year, unpressed cotton equal to 232,000 bales was consumed in mills in the Indian Union against 220,000 in the preceding year.

STATISTICS OF COTTON GINNED.

Apart from unpressed lint consumed in spinning mills, for which figures are available, unpressed lint is also utilised for domestic purposes, (extra-factory consumption such as hand-spinning, making of quilts, mattresses, etc., for which there are no reliable data. If ginning returns were instituted, all that would be required for arriving at the actual crop is a reliable estimate of the quantity of hand-ginned cotton used for domestic purposes. The ginning

and pressing returns would, at the same time, serve as a check on each other. The submission of ginning returns is now, in force in the States of Madhya Pradesh, Bombay, West Bengal, Uttar Pradesh, Madras, Punjab and Ajmer.

During the year under review, the Committee accepted the recommendation of the Special Sub-Committee appointed by it to examine the question of collection and publication by the Central Office of the Committee of all statistics pertaining to cotton, to the effect that the collection of the statistics of cotton ginned and cotton pressed by varieties should be undertaken by the Directorate of Economics and Statistics, Ministry of Agriculture, so that such statistics may be compiled and published on an all India basis. The intention is to publish weekly the figures for cotton pressed in each State, classified according to varieties, and to issue monthly the figures of cotton ginned similarly classified. The list of varieties for which the information is to be collected has been forwarded to the Directorate of Economics and Statistics. This list has been accepted by the East India Cotton Association.

IMPROVEMENT OF COTTON FORECASTS.

The cotton forecasts of the 1946-47 season for undivided India were, as usual, subjected to a post-mortem examination, by the Cotton Forecast Sub-Committee, with a view to detecting sources of error and suggesting remedial measures. As a result, the actual crop for the season was estimated at 4,303,000 bales against 3,639,000 bales forecasted in the final cotton forecast, the latter being short of the actual by about 15%. Separate details for the Indian Union and Pakistan in respect of the various factors involved in arriving at the actual crop are not available. Assuming, however, that the actual crop figures would be in the same proportion as the forecasted estimates of production, the actual crop of the Indian Union and Pakistan is estimated at 2,549,000 bales and 1,754,000 bales against the forecasted production of 2,155,000 and 1,484,000 bales, respectively. The discrepancies were mainly in the forecast estimates of the States of Uttar Pradesh, Punjab, Bombay (including Saurashtra), Rajasthan and Mysore. The attention of the concerned forecasting authorities was drawn to the discrepancies, with a view to their taking the necessary steps to improve the position in future forecasts.

SUPPLY OF MONTHLY REPORTS ON INDIAN COTTON TO THE INTERNATIONAL COTTON ADVISORY COMMITTEE.

In 1947, the Committee's office was entrusted by the Government of India with the work of supplying monthly reports on Indian cotton to the

International Cotton Advisory Committee, Washington. The required information was supplied as usual, during the year under review.

CROP ESTIMATING SURVEYS ON COTTON.

The Committee financed from 1942-43 to 1947-48, a scheme in Madhya Pradesh for determining more accurately the average yield of *kapas* per acre and the total production for the whole of the cotton area in the State by the method of random plot harvesting. The investigation has provided a scientific procedure for the formulation of the third, fourth and final yield forecasts and the State Government have adopted this procedure as an annual routine from 1948-49. The fourth and final forecasts for 1948-49 which were based more or less on the actual yield data, approximated very closely to the actual crop. A similar survey is being conducted every year departmentally in the Bombay State from 1946-47. It is proposed to utilise the results of these surveys to prepare the yield forecasts (fourth and final) of cotton from the 1949-50 season. In regard to the States merged in the Bombay State, it is proposed to prepare the yield forecasts on the basis of anna valuation as hitherto, as crop cutting experiments have not so far been undertaken in these States. The Committee has recommended that such surveys should also be undertaken by the other major cotton growing States.

EXPANSION OF THE STATISTICAL SECTION OF THE COMMITTEE'S OFFICE.

The question of expanding the Statistical Section of the Committee's Office into an Economics and Statistics Section has been engaging the attention of the Committee for some time past. The need for such expansion has been felt not only from the point of view of making available to the public more up-to-date and useful statistical data on cotton but also to provide through special studies, basic data which would be of assistance to the Committee in dealing with the various cotton problems of an economic and statistical nature coming up for consideration before the Committee from time to time. The Committee at its meeting in September, 1948, accordingly appointed a Special Sub-Committee to examine the whole question and suggest what new items of work should be undertaken, what additional staff would be required and what extra expenditure would be involved. After reviewing the position regarding the various items of cotton statistics collected and published at present by different authorities, the Special Sub-Committee recommended *inter alia* that the proposed Economics and Statistics Section should undertake

the following new items of work in addition to the work being done at present in the Statistical Section :—

- (1) Collection of data of prices and arrivals of cotton in the up-country regulated markets, preparation of a consolidated weekly summary of these prices and arrivals and a study of the relationship of the up-country prices with those in the Bombay market.
- (2) Collection of data on stocks held by the trade on the basis of the cotton licensing regulations.
- (3) Study of the progress of cotton pressings at specified dates in major cotton growing States.
- (4) Collection of additional data to meet the requirements of the International Cotton Advisory Committee, as far as possible.
- (5) Study of the trend in production and demand for various types of cotton including analysis of distribution into consumption channels.
- (6) Study of the trend of cotton prices in relation to those of other commodities.
- (7) Study of the relation of spot cotton prices to prices of futures contracts.
- (8) Surveys for the study of the cost of production of cotton and its rotation crops.
- (9) New schemes for crop estimating surveys on cotton for extending these surveys as an annual routine to all cotton growing States.

To cope with the work of the expanded section, the Special Sub-Committee suggested the appointment of additional staff including one Economics and Statistics Research Officer and one Statistician (Research). The recommendations of the Special Sub-Committee were approved by the full Committee and the Government of India's sanction to the proposals has been applied for.

PUBLICATIONS.

Statistical Leaflet No. 2—Fourteenth issue (1946-47) entitled "Stocks of Indian raw cotton held in the Indian Union by the mills and the trade on the 31st August, 1947", was issued during the year under review.

CHAPTER III.

RESEARCH.

Most of the research schemes of the Committee are concerned with the improvement of the yield of the plant, and the quality of its produce, the object being to enable the grower to secure the greatest profit. A number of research schemes, among which the most important are those for cotton breeding for the improvement of quality, are in operation in the various cotton growing States. The majority of these schemes are financed entirely by the Committee, while the cost of others is borne partly by the Committee and partly by the State Governments concerned. The Committee also makes grants to Departments of Agriculture in the various cotton growing States for specific investigations on cotton, not necessarily confined to the breeding of new varieties, the aim being to arrange for a well-directed co-ordinated effort for the improvement of every aspect of cotton in India. Since January, 1943, the expenditure on new schemes and extensions of old schemes sanctioned by the Committee, which are for the benefit of cotton growers, is being met from the Cotton Fund at the disposal of the Government of India. Research on cotton technology is carried on mainly at the Committee's Technological Laboratory in Bombay. In addition, trained Technological Assistants are posted at the Cotton Research Stations at Surat, Dharwar, Nagpur, Coimbatore, Indore, Nagpur, Abohar and Nanded to help the botanists-in-charge in their work of breeding improved varieties of cotton.

The work carried out in both research and testing sections of the Laboratory made good progress during the year. Valuable assistance was rendered to cotton breeders by testing their improved strains to select types which would bring better monetary return to the cultivators and would prove more acceptable to the trade and the textile industry. The interests of the latter were served not only by carrying out tests for them on trade varieties but also by carrying out scientific investigations on the causes of defects in processing etc., and suggesting suitable remedies for removing them. In spite of the stoppage of receipt of agricultural samples for tests from Pakistan area after the partition, the total number of samples received for tests in the Laboratory was practically the same as before partition, being in the neighbourhood of

1,200. This is due to the keen interest taken by breeders in evolving long-staple strains, and the consequent rise in the number of samples received for micro-spinning tests. It is also partly due to the receipt of a larger number of samples from the trade and textile industry, which have taken fullest advantage of the facilities available at the Laboratory. During the year under review, 346 reports of various kinds were issued against 259 reports issued in the preceding year.

The work on the estimation of the spinning values of Indian cottons from their chief fibre-properties was completed and various regression equations were worked out. It is stated that by using these formulae a cotton breeder would be able to estimate the spinning value of his new strains with a fair degree of accuracy from its fibre-properties only. To measure the strength of attachment of fibres to seed, an apparatus was specially designed and perfected. Tests revealed several interesting facts. The strength of attachment of fibres to the seed was much greater at the micropylar end than on other parts of the seed. A balance of the 'cement balance' type was designed for rapid and direct determination of ginning percentage of small samples in cotton breeding work. A small gin suitable for the use of cotton breeders was also designed, and it is proposed to manufacture it in Bombay.

The micro sample spinning technique which was previously applied for only 30s counts was extended to 14s, 20s and 40s counts also. It was found that the correlation coefficient between the values obtained by the micro and the standard spinning tests was satisfactory for 14s, if the range is not restricted, and also for 20s. In the case of 40s, there was a distinct tendency for the longer cottons to spin better relatively under the micro spinning technique than under the standard method.

Some of the other items of work of the Laboratory were the following :—

- (a) Work on preparation of cellulose sheets and similar materials from Indian linters was continued.
- (b) The air permeameter primarily designed to measure the air permeability of fabrics was employed after necessary modification to measure the fibre fineness.
- (c) In order to standardise the method of measuring halo-length, the different methods followed at the various breeding stations

were subjected to a critical study, and it was found that the method employed for measuring halo length at Coimbatore gave results very nearly similar to those obtained by the sorter machines. It was, therefore, considered to be by far a more accurate method than those in use at other stations.

- (d) A quick and efficient method of estimating fibre maturity by the polarised light technique was under investigation. The mature fibres were found to be coloured yellow and green under polarised light while the immature ones appeared pink and blue.
- (e) A working model of an 'Unspinner' was fabricated. This device saves time and labour in testing the quality of fibres in yarns by facilitating untwisting of yarn without damage to fibres and their removal from yarns.

Some of the interesting and useful tests carried out on agricultural samples are described below :—

- (i) Tests carried out in several districts in South Gujerat showed that the two strains 1-4-1-5 and 3652 are superior to the present Suyog variety. Extra-long stapled strains derived from (Co.2 x Sea Island) are being tried in tracts where rainfall is precarious and have been found to possess a staple length of more than 1½".
- (ii) Comparative mill and laboratory tests showed that Jayadhar (2-3-68) was superior to Jayawant and that Laxmi (9-3) could easily replace Gadag 1 in Karnatak.
- (iii) In the Utter Pradyh, among the *Desi* varieties, variety 35/1 gave the best test in respect of staple length and other economic characters while among the American varieties, 100F proved to be superior.
- (iv) Exhaustive trials made on 197-3 and Jarila, grown together in different localities in Khandesh, indicated that though 197-3 was definitely longer in staple than Jarila, it was somewhat coarser and inferior spinning in almost all localities.

Spinning tests were made, as usual, on representative standard and trade varieties of Indian cottons and the results were published in technological bulletins and circulars for general information of the trade and the textile

industry. Tests on 414 samples of various textile fibres, yarns and cloths as compared with 391 samples last year, were carried out on behalf of firms and mills in the Testing House of the Laboratory.

Satisfactory progress was recorded in many technological investigations besides those described above. Pre-cleaning and ginning tests on Mathio cotton were completed. Cleaning the seed-cotton in openers prior to ginning reduced the blow-room loss by about two percent for roller ginned samples and by one percent for saw ginned samples. Investigation into causes of the difference between the spinning qualities of saw ginned and roller-ginned cotton was continued. A consolidated report on comparative ginning tests carried out at ginning factories and at the Technological Laboratory was sent for publication. Some of the other investigations in progress at the Laboratory were the following :--

- (1) Effect of manures on fibre properties and spinning value of cotton.
- (2) A systematic study of the causes of neps, such as the incidence of structural deformities like kinks, spurs, apical ends etc., immature and insect attacked seeds in the *kapas*, hairiness of leafbits found in raw cottons etc.
- (3) The influence of different length groups of fibres on yarn-strength ; it was found that the fibres in the region of the modal length have the maximum share in contributing to the yarn strength.

The new American instrument known as the fibrograph was extensively used in the Laboratory for the determination of staple length. It was found to effect a great saving of time. A yarn evenness tester, which was also obtained from America is being standardised to measure the evenness class of yarns which has hitherto been done by visual examination only.

A scheme for the utilisation of some cellulose bearing materials (other than cotton) financed by the Council of Scientific and Industrial Research, was in operation at the Laboratory.

Several papers on cotton technology were completed and sent up for publication.

FUNDAMENTAL RESEARCH WORK ON COTTON.

1. Genetics.

1. (i) **Chlorophyll deficiency.**—A single F_2 progeny raised in pots last year had shown simple monogenic segregation with normal as dominant. 12 F_2

progenies grown from as many sister F_1 s as could be obtained from the original chlorophyll deficient plant (even using the same flower), however, showed entire absence of any segregation in the field. It was further observed as a result of reciprocal crosses made in 1947-48, that chlorophyll deficiency was associated with the maternal effect, since the F_1 was normal (green) or deficient dependent upon the parent from which the hybrid seed was collected.

(ii) **Fuzz colour.**—Out of the 36 plants obtained from the green fuzzy seeds of Buri 107, only 4 had produced green or greyish seeds, and the rest had given only white seed. Green fuzzy seed of different grades collected from these four plants, sown during this year and the 4 progenies obtained therefrom, again showed segregation into intergrades of green fuzz colour, and white. The progenies obtained from white fuzzy seeds bred true to this character.

A sample of seed of local Cambodia, showing a mixture of green and white seeds, was obtained from the market and the two types of seeds were sown separately. In this case also it was found that while the white fuzzy seeds bred fairly true to this character, the green ones showed segregation into various intergrades of green. Although no definite opinion can be expressed in regard to the effect of fuzz colour on the economic characters, unless true breeding lines for different fuzz colours and fuzz densities are established, preliminary studies conducted by growing green and white fuzzy seeds from the market sample of Cambodia in 20 blocks, (individual plot size being $4' \times 10'$), showed that while there were no differences in the halo length, the crop obtained from green fuzzy seeds gave a significantly higher ginning percentage than that given by white fuzzy seeds. The mean values recorded are given below :—

					Halo length m.m.	Ginning percentage.
White fuzz colour	..	..	..	..	28.60	26.50
Green „ „		..	..	..	29.20	29.20
S.E.	..	..	..	..	0.83	0.72
C.D. at 5%	..	..	..	..	..	1.46

(iii) **Jassid resistance.**—A strain of cotton from Indore 1 was selected for Jassid resistance under the Cotton Genetics Research Scheme. In order to determine if continued selection for Jassid resistance had adversely affected the economic characters, the resistant strain was tested with the ordinary

Indore 1 sample of cotton seed in 20 randomised blocks, the individual plot size being 10'x2'. The results of this test given below show that continued selection for jassid resistance has resulted in reduction of ginning percentage.

						Halo length m.m.	Ginning percentage.
Jassid resistant strain from Indore 1	..	..	..	..	..	27.85	24.77
Indore 1 ordinary	..	..	..	..	..	27.83	30.93
S.E.	..	..	..	..	..	0.73	1.9
C.D. at 5%	..	..	..	..	..	..	3.8

(iv) **Interspecific hybridization.**—Out of the 1,222 progenies from the crosses of *G. thurberi* and *G. raimondii* with cultivated Asiatic *arboreum* and American species (*hirsutum* and *barbadense*) grown this year, 295 progenies have been selected for further trials. The remaining material will be bulked up and grown as such for making fresh single plant selections. The pedigree details of the progenies selected this year are as follows:—

	Cross	Progenies selected.
<i>G. arboreum</i> x <i>G. thurberi</i>	doubled x {	<i>G. hirsutum</i> 289
		<i>G. barbadense</i> 3
<i>G. hirsutum</i> x <i>G. raimondii</i>	double x <i>G. hirsutum</i>	3

(v) **Effect of agronomic factors on the yielding capacity of the seed:**—Previous year's results had shown that cotton seed obtained from widely spaced crop gave better yield and heavier seed. Results obtained this year do not, however, corroborate the findings of last year.

Seed from cotton crop grown under different agronomic treatments has been produced in sufficiently large quantity this year for conducting large scale trials in the coming season in order to test the results obtained hitherto.

(vi) **Vernalization : Heat treatment of seed:**—Previous year's work in this connection conducted on local *arboreum* and *hirsutum* cottons did not give any useful results. Seed of cotton strain 1027 A.L.F., which is found to be late-maturing under Indore conditions was, therefore, given the heat

treatment this year. The seed was kept with 60% moisture at room temperature of approximately 32° C for 5, 10 and 15 days. Seed from these different treatments was sown in plots of $10^1 \times 2^1$, replicated 10 times. Results given below show, that treatment of the seed for 10 and 15 days adversely affected the stand of the crop.

Mean stand of plants per plot.

0 day.	5 days.	10 days.	15 days.	S. E.	C. D.
8.8	8.3	4.8	1.2	0.4	1.2

In regard to the earliness, it is reported that flowering in the case of treated seed started a week earlier than the control.

2. Agronomy.

(i) **Long term rotational and manurial trial.**—The manurial treatments for the cotton crop this year were of three kinds, viz., (1) manuring of cotton without any manuring of previous jowar, which is termed as 'direct manuring of cotton', (2) manuring of cotton on plots where the previous jowar crop was also manured, termed as 'cumulative effect of manuring on cotton,' and (3) growing cotton without manuring on plots where the previous jowar crop had been manured, this being termed as 'residual effect on cotton'. As the groundnut crop preceding cotton was not manured, results of cotton from this series of plots represent only the effect of direct manuring of cotton.

In the case of cotton following jowar, application of nitrogen increased yield significantly and among the different forms of nitrogen, ammonium sulphate was almost significantly superior to farm yard manure or groundnut cake. The results obtained are given below :—

Yield of kapas in lbs. per acre.					
No manure	Ammonium sulphate.	Groundnut cake.	Farm yard manure.	S. E.	Sig. diff.
265	309	283	283	8	24

Addition of P_2O_5 as superphosphate in conjunction with nitrogen increased the yield beyond the average of the two fertilizers added separately and in this respect also ammonium sulphate proved superior to the other two kinds

of manures. Groundnut cake came next, but farm yard manure showed no interaction with phosphate. Results obtained are given below :—

Yield of kapas in lbs. per acre.

Source of nitrogen	Nitrogen alone.	Phosphate alone.	Nitrogen plus phosphate.	S. E.	Sig. diff.
Ammonium sulphate ..	300	277	351	12	34
Groundnut cake ..	280	256	313		
Farm yard manure ..	277	287	287		
Average	286	273	317	7	20

A comparison of the direct cumulative and residual effects of nitrogen or its interaction with phosphate showed that there was no residual effect of previous manuring on cotton and consequently the increase in yield due to direct and cumulative manuring was equal in magnitude.

Yield of cotton after groundnut was found to be much higher than that after jowar. The effect of nitrogen was significant, but different forms of nitrogen did not show significant differences. There was also a significant interaction between nitrogen and phosphate. Results obtained are given below :—

Yield of kapas in lbs. per acre.

No manure	Ammonium sulphate.	Groundnut cake.	Farm yard manure.	S. E.	Sig. diff.
364	423	453	403	19	56

Nitrogen	Phosphate	Nitrogen and Phosphate.	S. E.	Sig. diff.
396	420	460	14	37

Note.—Standard errors in the above tables are for differences of treatments from the average of the no manure plots.

(ii) **Manurial trials with graded doses of nitrogen and phosphate.**—This trial was conducted in two fields of medium and low fertility respectively,

with doses of 0, 20, 40, 60 and 80 lbs. nitrogen in the form of groundnut cake and ammonium sulphate, together with 0 and 40 lbs. of P_2O_5 per acre as bone char. Each trial had 3 replications the plot size being 1/112 acre. Cotton sown was Jarila in soil of medium fertility and Dhar 43 in that of low fertility. The manures were drilled before sowing in separate rows. Results obtained show that applications of nitrogen gave significant increase in yield in both the fields, a dressing of 60 lbs. of nitrogen giving the highest yield. Nitrogen in the form of groundnut cake gave significantly higher yield than that in the form of ammonium sulphate in both the fields. The effect of phosphate was not significant whether used singly or in combination with nitrogen. Average yields for different doses of nitrogen and for the two forms of nitrogen are shown below :—

Yield of kapas in lbs. per acre.								
			0 lb. N	20 lb. N	40 lb. N	60 lb. N	80 lb. N	Sig. diff.
Medium fertility field	..	..	263	376	389	403	378	82
Low fertility field	..	..	172	223	212	263	236	48

			Groundnut cake.	Ammonium sulphate.	Sig. diff.
Medium fertility field	..	..	424	300	51
Low fertility field	..	..	238	204	30

(iii) **Soaking of cotton seed in nutrient solutions.**—This experiment was repeated on the same lines as described in the last year's report. Yields of *kapas* per plant for the different nutrient solutions and for the different varieties of cotton included in the experiment are given below :—

Yield of kapas in gms. per plant.							
Variety.	Amm. sulph.	Mono Pot phosphate.	Amm. phosphate.	Tri Pot phos.	Pot. nitrate.	Control.	Dry seed.
Dhar 43 ..	5.66	5.26	4.66	4.36	3.82	3.16	3.25
Jarila ..	5.29	4.80	4.26	3.93	3.45	3.00	2.88
M.U.4 ..	4.96	4.43	3.94	3.70	3.65	3.01	2.71
X 4463 ..	4.66	4.52	3.70	3.57	3.68	2.85	2.85

The results are very similar to those obtained last year, except that the level of yields both in the control as well as treated plants is lower this year and soaking the seed in plain water did not prove as effective as it did last year.

3. Statistics.

(i) **Field technique.**—Study of incomplete block designs.—In view of the divergent results obtained from different uniformity trials examined at Indore in regard to the efficiency of incomplete block designs and the generally more favourable results reported by American workers in this respect, investigation has been started into the conditions which determine the efficiency of these designs. An important factor, as reported last year, is the difference in the magnitude of the intraclass correlation within the incomplete and complete blocks. It has been found from the results of analysis that a higher efficiency of the incomplete block designs is expected only in those cases where the correlation coefficient in incomplete blocks is higher than in complete blocks by at least 0.2. Among other factors affecting the efficiency of incomplete block designs, size of plots and of blocks or replicates are significant. It has been observed that in all cases where the plot size was small, i.e., 48 sq. ft. or less, as also where the replicate size was less than 3,000 sq. ft., incomplete block designs did not show a higher efficiency than simple randomised blocks, irrespective of the number of varieties or their grouping into incomplete blocks. This result leads to the conclusion that for progeny row trials, the incomplete block designs are not likely to have any advantage.

(ii) **Statistical study of genetics of quantitative characters :—(a)**—Suitability of Malvi cotton from different sources for selection. An experiment with local Malvi seed from seven different localities in Malwa was carried out in 1944-45 in order to illustrate the method of examining the initial breeding material for its capacity to respond to selection. Results for mean values, genetic variability and estimated response to selection in three characters, halo length, ginning percentage and yield, were described in the Annual Report for the year 1946-47. Examination of fibre weight and its statistical analysis have now been completed as far as the first varietal trial was concerned and the results are summarised below.

It will be recalled that 25 Malvi (broad leaf and yellow flower) plants were selected randomly in each of the six replicates for each variety. Fibre weight

was determined by the method described by Panse and Sahasrabudhe (Ind. J. Genet. and Plant Breed. 1943) on the produce of each plant separately by sampling two seeds and measuring fibre weight of a bunch of fibres on each seed, in which more than two thousand separate determinations and their conversion into weight in mg. per cm. of fibre length were involved. Mean fibre weight for each variety or source of seed and the observed variation between plants in this character are given in the following table :—

Mean fibre weight per variety and standard deviation between plants.

Variety or locality						Mean fibre weight (mg. x 10 ⁻⁵ /cm)	Standard deviation per plant.
Indore	..	..	..	..	..	250.8	58.08
Ratlam	..	..	..	..	..	247.9	60.99
Dhar	..	..	..	..	..	240.6	65.26
Rajgarh	..	..	..	..	..	264.6	56.39
Bhopal	..	..	..	..	..	251.0	65.10
Partabgarh	..	..	..	..	..	263.2	61.06
Tonk	..	..	..	..	..	307.8	66.79
S. E.	..	..	..	..	..	7.16	
Sig. diff.	..	..	..	..	..	20.7	

The fibre weight results confirm the earlier finding from halo length data that the Tonk sample though broad leaved and yellow flowered is not typical Malvi, its fibre weight being significantly higher than all other samples. The remaining samples appear to fall into two groups, Indore, Ratlam and Dhar samples giving a lower fibre weight than the more northerly areas represented by Rajgarh and Partabgarh and the easterly area represented by Bhopal. From a consideration of mean values, the finer Malvi type would be found in the south-western portion of the region. The Indore sample is noteworthy as it combines low fibre weight with long fibre and high ginning. This superiority of Indore seed was seen in an earlier investigation also.

Variation in fibre weight within the different varieties is of the same order and no significant differences were found among the variances. The standard deviation given in the table, however, represents the gross variability observed among plants and the possibility that genetic variability may be different remains to be tested. This can be done by examining the fibre-weight of

progenies grown from randomly selected plants in each variety. This progeny row experiment has been carried out and samples of seed cotton have been taken for determining fibre weight. The work will be taken up as opportunity occurs.

(b) **Genetic variability and response to selection** :—An experiment is in progress in which selection for high and low halo-length has been continued from F_3 onwards in each of six *arboreum* crosses. The progress made in halo-length due to selection upto F_7 which was grown last year was described in the last year's report. Other characters of the F_7 material were statistically analysed in order to study how far selection applied to halo-length, had the effect of inducing an indirect selection in other characters owing to a correlation between halo-length and these characters. Results available for ginning percentage and yield per plant are given below :—

Mean values of progenies selected for high and low halo-length.

				Halo-length mm.		Ginning %.		Yield per plant gm.	
				High.	Low.	High.	Low.	High.	Low.
D. 77	x Sh. 764	..	..	31.0	29.8	30.0	32.5	11.2	7.2
D. 77	x Gao. 115	..	..	29.9	21.2	31.3	34.3	10.7	9.4
Cwn. 520	x Sh. 764	..	..	30.4	22.1	32.2	35.6	8.1	6.2
B. G.	x Sh. 764	..	..	29.7	21.1	31.3	31.8	5.4	7.5
B. G.	x Jarila	..	..	32.8	24.5	31.9	36.3	12.3	9.1
R. 10	x Sh. 764	..	..	29.2	20.9	32.0	33.1	11.6	9.2
S. E. diff. for each pair				0.35		0.70		1.0	
Average for all crosses				30.5	21.8	31.4	33.9	9.9	8.1
S. E. diff. for average				0.14		0.20		0.42	

It is clear that simultaneously with the change in halo-length, ginning percentage was altered in the opposite direction, and progenies selected for high halo-length have a lower ginning percentage than those selected for low halo-length. This negative relationship between the two characters was seen consistently in all crosses. From the average values given at the bottom of the table, a change of 8.7 mm. in halo-length was accompanied by a change of 2.5% in ginning percentage. The magnitude of the change varied in the

individual crosses, and in two crosses, B. G. x Sh. 764 and R. 10 x Sh. 764, the difference in ginning percentage between the high and low halo-length lines was not significant. This coupled with some other results described in the previous reports concerning the correlation between ginning percentage and fibre weight on one hand and staple length on the other, provides a reasonable ground for inferring that the negative correlation between ginning percentage and halo length observed in the present material is genetic and not physiological. This would mean that with intensive relation, it should be possible to obtain genotypes combining high halo-length and good ginning percentage.

Yield per plant was also affected by selection for halo-length and progenies selected for high halo-length have, on the average, a higher yield per plant than those selected for low halo length. The figures for yield given in the table were adjusted for differences in stand and show considerable variation among the different crosses. Before commenting on these results, it should be noted that along with the main selection for halo-length, some selection for yield was likely to have been made in each generation; because progenies and plants selected for halo-length had sometimes to be rejected for lack of sufficient seed for the next season's replicated trial and replaced by other progenies and plants which provided sufficient seed for this purpose. The question of the extent and intensity of this secondary selection is being examined with the help of the past records of selection.

(iii) **Discriminant function for selection of yield in cotton :—**The discriminant formula for selection of yield in cotton calculated from an experiment with 210 Malvi progenies was reported last year. The results obtained so far in the investigation on this subject were summarised in a paper entitled "A discriminant function for selection of yield in cotton" which was read at the fourth Cotton Research Workers' Conference in February, 1949. The conclusion was that a discriminant formula based on components of yield did not provide a more efficient method of selection than selection based on the phenotypic value of yield itself. In order to make a further test on this point, a replicated trial in four blocks was carried out with 80 Malvi progenies from parents selected randomly from the above trial. The values of the parent plants were scored by means of the discriminant formula derived from the trial from which these parents were selected. A correlation between the mean yields of progenies grown from these parents with the discriminant score of the

parents and also with the phenotypic yield of the parents was calculated and the following results were obtained :—

	Correlation coefficient.
Between the yield and discriminant score of parent plants	0.928
Between the yield of parent and mean yield of the progeny	0.424
Between the discriminant score of the parent and mean yield of the progeny	0.434

A comparison of the last two coefficients demonstrates the conclusion given above and shows that the discriminant score and phenotypic yield of plants are equally efficient for selection for yield. The first coefficient with its high value provides an explanation for the result.

Scheme for interspecific hybridisation in cottons at Surat : This scheme was sanctioned by the Committee in January, 1938, for a period of five years, with the object of obtaining, if possible, fully fertile hybrids between Asiatic and American cottons, combining the useful agronomic characters of both, particularly the good staple length of the American and hardiness and adaptability to Indian climate of the Asiatic. Work on crossing Asiatic and American cottons, begun at Surat in 1932, had already yielded 23 hybrids in which the American parents used were mostly the acclimatised Upland types from different parts of India, while the Asiatic parents were forms of *G. herbaceum* and *G. arboreum*. The hybrids produced from these were, however, sterile and efforts to induce fertility in them were successful only when they were backcrossed to American types. In January, 1940, the Committee sanctioned an expansion of the scheme so as to include cytological studies during the remaining period of its continuance. In July 1943, the scheme was extended for a further period of five years from the 1st November 1943. In March 1948, another interim extension of the scheme for a period of six months from the 1st November 1948 was sanctioned and in September 1948, a further extension of 4½ years with effect from 1-5-49, was granted. During the year under review, types derived from fertile backcrosses of American × Asiatic cottons were further tried in replicated tests. Some of them in addition to having satisfactory yield, possess ginning percentage ranging from 32% to 37% and, staple length 0.94 inch to 1.02 inches as against 36% ginning outturn and 0.90 inch staple length of Suyog and 35% ginning outturn and 0.92 inch staple length of Co. 2.

One of the types, viz., 68-5-B-2, is specially important for having extra-long staple of 1.07 inches with fairly good ginning percentage (31%) and yield as good as Suyog.

Trial of hybrids of Co. 2 or U4 x Sea Island gave promising results in having fine, long(1.19 to 1.28 inches), lustrous, strong and silky lint with moderately good ginning percentage (33%) and satisfactory yield (306 lbs. per acre as against 270 lbs. for Co. 2 and 336 lbs. for Suyog). The hybrid population was attacked by jassids in early stages of growth and had slightly defective opening of bolls. The work on crosses and backcrosses between *hirsutum* and *barbadense* species is being intensified with the object of evolving long linted types.

Trial of the interspecific plant material under irrigation in Deccan canals area showed that some of the types possessed as good a yield as Co. 4 but had higher ginning percentage and longer staple.

The use of wild types in cotton backcrossing has shown that *G. tomentosum* imparts high degree of resistance against jassids and Red Leaf Blight. Crosses with *G. anomalum* are under study for breeding for resistance to Black Arm disease.

Further generations of hexaploids produced by giving colchicine treatment to sterile hybrids of American (Co. 2) x Asiatic (1027 A.L.F.) cotton had given fertile progenies varying in earliness and other economic characters. Selection work in these populations is in progress. The cytology of this material is also being studied.

PHYSIOLOGICAL RESEARCH.

Scheme for Cotton Physiological Research, Indore. Arising out of the work done under this scheme in the Punjab and in order to investigate the applicability of the results achieved there to other areas, the Committee, at its meeting in January 1944, sanctioned a new scheme for Cotton Physiological Research with headquarters at Indore. The aim was to obtain, as far as possible, precise knowledge of the inter-relationship between the soil and climatic factors and the growth of different varieties of cotton in irrigated as well as unirrigated areas and then attempt to apply this knowledge for improving the quality and yield of cotton in general. In February 1947, the scheme was extended for a period of five years, with effect from the 1st March, 1947.

During the year under report the investigations on the effect of trace elements on the growth and yield of American cottons in Central India tract were continued to check up the previous year's finding that while chromium, zinc and manganese significantly increased the yield by 20 to 25%, increases due to boron, copper, iron and magnesium were small and statistically non-significant. The yield results obtained in the second year confirmed the findings of the previous year with two differences. While chromium and zinc significantly increased the yields, the increase produced by manganese was smaller than in the previous year and was not significant. The increase produced by boron in the second year was high and significant which was not the case in the previous year.

Increase in yield produced by the applications of zinc, chromium, boron or manganese did not suggest that these elements were deficient in the soil or were unavailable. In fact, crop in the control plots did not show any deficiency symptoms. It is known that these elements increase the rate of oxidation of organic matter in the soil and thus make more nitrogen available to the crop when applied. Further investigations will, therefore, include a study of the effect of these trace elements on the rate of oxidation of organic material in the soil.

Though chromium, zinc and boron significantly increased the yields, the detailed growth data collected in the first experiment in 1948-49 season did not show any effect on the vegetative structure of the plant such as height, node number or dry weight per plant. There was a slight earliness in the maturity of the crop in the presence of these elements. A study of the technological properties of the lint collected in 1947-48 season and tested at Matunga Technological Laboratory did not show any effect on the quality of lint except for the greater percentage of immature fibres in the molybdenum plots.

An experiment to study the residual effect of the trace elements was laid out in *rabi* season of 1947. Cotton was grown after wheat in 1948. Though there was no effect on the yield of wheat, copper gave a significant increase in the yield of cotton while the increases due to boron, chromium zinc, manganese and iron did not reach the level of significance.

In studies conducted with close-spaced *herbaceum* cotton at Surat and Indore, it was found that close spacing (*i.e.*, 4 sq. ft. per plant against the normal of 12 to 16 sq. ft.) reduced the reproductive growth of the crop to such an

extent that the decrease in fruiting could not be made good by even a high increase in plant number per acre. This decrease in reproductive growth under close spacing was partly caused by an insufficiency of nitrogen as by applications of nitrogen the yields under closer spacing were greatly increased even though they did not reach the same level as the yields under wider spacing under similar conditions of manuring. Thus inadequacy of nitrogen supply appeared to limit the growth and yield under close spacing. However, it was also found that the suppression in root growth became greater and greater as the spacing became closer and that this too acted as a limiting factor even when the crop was heavily manured. The depression in root growth, therefore, affected adversely the shoot growth and bearing, causing lower yields. Further investigation to elucidate this point seems called for.

The chemical analysis of the leaves of the crop at maturity under different treatments of nitrogen, potash, phosphoric acid and lime indicated that the nitrogen concentrations of leaves were higher in widely spaced crop than in closely spaced crop. This suggested that all nitrogen was not utilized for growth in widely spaced crop on account of a deficiency of phosphoric acid which was found comparatively in lower concentration in the leaves of widely spaced crop. It was, therefore, concluded that the application of phosphoric acid in combination with nitrogen may further increase the yields and this was found to be the case. The increase in yield under such combination became greater as the spacing became wider. 50 lb. P_2O_5 in combination with 75 lbs. to 100 lbs. Nitrogen appeared to be the best combination.

The investigations on the red leaf disease in American cotton in the Central India tract and in the Bombay Karnatak tract confirmed the two main findings of the previous year at Indore. It was found that the leaf reddening that occurred at the fruiting stage developed as a result of depletion of food materials from leaves and it could be prevented by debudding the plants. The leaves of debudded plants remained green until the end of the season. Secondly, the application of ammonium sulphate to American Upland cotton was found to hasten maturity and consequently reddening. Reddening appeared a fortnight earlier in the manured plots. Similarly, the crop matured earlier by 8 to 12% in the manured plots as determined by two methods. Further investigations revealed that early maturity in the manured plots was partly due to the early initiation of flower buds and partly due to greater rate of flowering and bolling. The buds appeared a week or ten days earlier in the

manured plots. Similarly, the rate of flowering and bolling was higher in the manured plots than in the control plots, especially during the first half of the flowering and bolling periods.

The same two physiological tests of (1) debudding and (2) manuring with ammonium sulphate were applied in Dharwar American cottons grown at Gadag in 1948-49 season to determine if the causes of the leaf reddening in that tract were similar or different from those that seemed to operate in the Central India. The results of both the test were negative. Thus leaf reddening in Dharwar-American cottons is probably due to the operations of other factors which yet remain to be determined.

Biochemical investigations of the leaves to determine the changes occurring in the leaves that led to reddening were undertaken. pH of the leaves and the changes in the carbohydrate content of the leaves were determined for the debudded plants and for plants that were allowed to fruit normally. The leaves of randomly selected plants from control plots and from plots where the plants were debudded every week were taken for these weekly determinations. The pH of the leaves is said to have declined as the age advanced in both the series indicating that the cell sap turned acidic as the plants grew older. As the cell sap was acidic in debudded as well as the fruiting series, the absence of the red colour in the former case might be due to the non-formation of anthocyanin pigments. This point is proposed to be investigated further. Another noticeable difference between the two series was that while the extracted leaf juice of the debudded series was green upto the end, the leaf juice of normally fruiting plants turned brown as the age advanced indicating decomposition of green pigments.

Preliminary field experiments were conducted in the Mewar tract to determine the effect of sowing time, spacing and manuring on the yields of American cottons. The crop sown in June before the beginning of rainy season gave on the average 14 maunds seed cotton per acre as compared with 10 maunds produced by the crop sown in July after the beginning of monsoon. In both cases one irrigation was given in the month of October-November.

The close spacing of 1 sq. ft. per plant ($1^1 \times 1^1$) gave maximum yields both for June and July sowings in all the three experiments while the response due to manuring was small and uneconomical though significant.

COTTON RESEARCH IN STATES. BREEDING OF IMPROVED VARIETIES.

Bombay.

(a) **Broach Cotton Breeding Scheme.**—The Cotton Breeding Scheme at Broach has been in operation since April 1932. The original object of this scheme was to obtain by selection or hybridization, suitable types of cotton possessing wilt-resistant, high yielding, high ginning and superior spinning qualities, to replace the local mixture, a large proportion of which consisted of Goghari a short staple, high ginning (40%) variety. In view, however, of the Committee's policy to replace, wherever possible, short staple with medium and long staple cottons, attention is now being concentrated on wilt-resistance, high yield and fibre length.

The breeding of wilt-resistant types originally formed part of the Broach Breeding Scheme, but as it was considered desirable that this work should be done under optimum conditions of wilt infection, and as the required conditions, especially soil temperature in pots, were difficult to maintain at Broach, this part of the work was transferred to Poona, in June 1935, together with similar work on cottons for the Jalgaon tract.

During the year under report the wilt incidence was very poor even in the wilt-sick soil and the susceptible type 1927 A.L.F. had very low mortality of 1.7%. The wilt incidence due to discoloration was below 7.5% in all the cultures as against 23 of 1027 A.L.F. Five progenies from each of the ten families were tried in compact family block in wilt-free soil. There was no significant difference in the yield of *Kapas* in the progenies of these families.

The bulk seed from ten promising cultures from crosses of B.C. 1-2 (Vijay) and 1027 A.L.F. along with No. 3652 (Shera bred), Nos. 1864 and 2334 (Surat bred) with B.C. 1-2 as check were tried in a randomised replicated test in wilt free soil. There was no significant difference in yield of *kapas* between any of the cultures. Their ginning percentage ranged from 37.33 to 40.21 as against 38.21 of B.C. 1-2. The differences in lint yield were significant and two cultures from H.S. 98 and one from H.S. 72 were significantly superior to B.C. 1-2. The percentage of increase over the control for lint yield ranged from 6 to 21%. The staple except in the case of 189-58 is longer than that of B.C. 1 2 by 0.03 to 0.06 inch. The fibre weight of all the cultures derived from H.S. 98 is lower than that of B.C. 1-2.

Fifty five promising cultures from the crosses and back crosses of B.C. 1-2 and B.C. 1-6 with 1027 A.L.F. were tried in three replications. There was no significant difference in the yield of *kapas*. Their ginning percentage ranged from 33.3 to 40.5 and staple length from 20.4 to 23.1 mm. as against 36.8 ginning percentage and 22.0 mm. staple length of B.C.-2. Besides, one hundred and forty five cultures from the crosses of the same parentage were grown in single rows. Their ginning percentage ranged from 35.1 to 41.1 and staple length from 21.7 to 24.6 mm. as against 37.2 ginning percentage and 22.6 mm. staple length of B.C. 1-2.

As regards earliness, the bulk seed of extra early cultures with B.C1-2 as check was tried in six randomised replications. Earliness, that is, percentage of produce picked up to middle of December in all cultures except (B.D.8 early X 1-2) F6-10 ranged from 61 to 73% as against 44% of B.C. 1-2. There was no significant difference in yield but the ginning percentage was rather less than in B.C. 1-2. Further selection had been made in 26 early cultures with a view to combine the economic characters with earliness.

The fibre properties and spinning value of B.C. 1-2 in the nucleus plot as well as in the replicated plot were quite up to the mark in 1947-48. Selection No. 3652 gave the highest staple length of 1.00 inch with low fibre weight. Similarly H.S. 66-60 was coarser though longer and fetched highest value. H.S. 98-41 and 98-24 had longer fibre, lower fibre weight and higher spinning value. Their superior spinning performance had been confirmed by micro-spinning test in 1948-49.

Vijay cotton—B.C.1-2 was multiplied on an area of three acres and 438 lbs. selfed seed was produced this season.

Scheme for cotton breeding in Khandesh. This scheme was sanctioned in November 1947 and it commenced working from the 1st April, 1948. The object of the scheme is to test extensively the strain 197-3, which is derived from a cross between Jarila x N.R. and which is not only superior to Jarila in yield by 15% and in ginning outturn by 4%, but has also a slightly longer staple. It is also intended to improve its fibre quality by crossing it with varieties possessing fine long staple.

During the year under report final district trials of 197-3 and Jarila were arranged in 25 places in the district under varying conditions of soil. The

statistical analysis of the results showed the superiority of 197-3 over Jarila in yield of *kapas* and lint per acre, ginning % and staple length confirming the previous findings. The variety 197-3 was valued at Rs. 55 'on' Jarila per khandi. In regard to wilt-resistance, 197-3 was as good as Jarila.

Seven mill tests on the bulk samples of 197-3 and Jarila collected from different localities showed that the two varieties were almost similar in spinning quality.

Secondary selections made in 197-3 as well as Jarila last year with a view to obtain, if possible, longer stapled and lower fibre weight cultures than the average 197-3 and Jarila crop, were studied. Ten cultures in each case gave better yield and staple length than the respective control variety. They have been selected for further trial.

Several crosses of 197-3 with N.R. 5, Jarila and 9-2-8-3-3 were also under study. The crosses are still in the early stages of experimentation.

It is stated that 2407 lbs. of seed of 197-3 obtained from various trial plots and from the nucleus plot on Jalgaon Farm in 1948-49 would be given in the district for multiplication departmentally with a view to finding the response of the cultivators and the trade to this variety when produced and marketed on a large scale.

(c) **Scheme for breeding wilt-resistant cottons in Surat area.** This scheme commenced work in April 1937. The object of the scheme is to obtain a strain of cotton completely resistant to wilt and suited to the soil and climatic conditions obtaining in the Surat tract. This is sought to be achieved either by selection in 1027 A.L.F. or by crossing this cotton with B.D. 8 or other wilt-resistant strains.

The rainfall during the season was far below the normal being only 6.69" as against the average of 30" for the tract. The crop that was sown in the last week of July could not survive due to want of subsequent rains. Only a few plants of the cross 3652 x 1027 A.L.F.—F₁ could be grown to maturity by hand watering. The two wilt-resistant types *viz.*, 2266 and 3652 bred at Shera from the material originally sent from Surat were also grown for trial on a cultivator's field. But here too the crop failed on account of the failure of

the monsoon. Type 2266 possesses the necessary agricultural characters but has a somewhat coarse staple. Type 3652 is shorter stapled than 1027 A.L.F. but is considered suitable for cultivation in the wilt areas of the Surat cotton tract. The ginning outturn of both the strains is 1.5% higher than Suyog and 4% higher than 1027 A.L.F. It is proposed to improve the staple length of 3652 by crossing it with 1027 A.L.F.

The material tested at Poona indicated that the progenies of the two cultures, viz., 2266-1-4-3 and 3652-22-2-11 showed a high resistance to wilt.

(d) **Scheme for improvement of Wagad cotton at Viramgam, Jagudan and Bavla.**—While examining the possibility of growing medium and long staple cotton in the short staple areas of India, the Committee, in August, 1935, decided that a comparative study of Indian and Iranian *herbacuem* cottons should be undertaken, with the object of finding out one or more suitable types for the large Dholleras tract. A special Officer was deputed to Iran to collect *herbacuem* types of cotton grown there and, in August 1936 a five-year scheme was sanctioned for the improvement of Wagad and Mathio cottons, the work on Wagad cottons being centred at Viramgam and that on Mathio at Amreli. This improvement is sought to be achieved by (a) selection in Wagad cotton, (b) hybridization with Surti-Broach quality cottons like 1027 A. L. F. and B. D. 8 and (c) hybridisation with Iranian *herbacuems* known to be early maturing and of better quality.

The Wagad area is divided into two main tracts (i) the Viramgam tract, characterised by low rainfall and (ii) the Dholka tract with greater and more regular rainfall. The main breeding crop is grown at Viramgam but simultaneously a small area is sown under irrigation at Jagudan to safeguard the work at Viramgam. In July 1941, it was decided to establish a sub-station at Dholka for conducting botanical work on the promising material obtained from Viramgam.

The pre-war area under Wagad cotton was 13,00,000 acres, out of which 3,30,000 acres were in Ahmedabad district (Bombay State), 1,04,000 in Mehsana Prant (Baroda State) now merged in Bombay State and the rest in Saurashtra and Cutch. The work of the scheme has already yielded one improved strain—Kalyan—which is suitable for the cotton tracts in Ahmedabad district,

Mehsana Prant and Dhrangadhra in Saurashtra Union.

During the year under review, work was continued for the further improvement of Kalyan. Several early maturing progenies are reported to have given promising results. On the other hand, the hybrid cultures tested at Viramgam failed completely on account of the acute famine conditions. A small quantity of their seed is, however, available and it is proposed to study them again in 1950.

(e) **Scheme for improvement of Dharwar-American cotton.**—This scheme was sanctioned by the Committee in July 1941 for a period of five years, and extended in February 1947 for further five years. The work was commenced in April 1942. The object of the scheme is to improve the Dharwar-American cotton crop grown in the Kannada districts of the Bombay State, the adjoining areas of the Madras State and in Hyderabad and Mysore States. This object is sought to be achieved by the development, (by selection or hybridisation), of an early maturing type, superior to Gadag 1 in respect of, yield, staple length and ginning percentage, and which is, at the same time, more resistant to 'red-leaf' blight. The work is being done at Gadag, where conditions of soil, climate, rainfall, etc., are suited to the cultivation of *hirsutum* cotton.

To enhance ginning outturn and resistance to red-leaf blight of Gadag-1, it was crossed with Co. 2. Out of the several families isolated from this cross seg 9-3, was found to combine all the requisite field and trade characters. During the last seven years, 9-3 was compared with Gadag-1, both on the breeder's plot at Gadag and on the cultivators' fields. The new strain showed superiority over Gadag-1 in *kapas* yield by 24.6%, in ginning outturn by 3.2%, in lint yield by 32.2% in staple length by 15.8% and in spinning value by 23.5%. Comparative mill tests of both the varieties were undertaken at the Century Mills, Bombay, and at the Technological Laboratory Matunga, during the year under report. These tests showed that strain 9 3 was decidedly superior to Gadag-1 in all the requisite commercial characters. The new variety has been re-named Laxmi, and a scheme for replacing Gadag-1 with it has been sanctioned by the Committee. In order to further improve the characters of Laxmi, hybridisation was taken up with superior varieties

like Co. 2, Co. 3, Co. 4, Perso-American, M. 4, Kampala, etc., and several cultures from all of them are under study.

The application of nitrogenous manures in the form of groundnut cake and sulphate of ammonia during the last two years indicated that ammonium sulphate applied at the rate of 40 lbs. N. per acre at the time of sowing gives the best results. This indication, however, needs confirmation by further trials.

(f) **Scheme for improvement of Mathio cotton at Amreli.**—This scheme has for its object the improvement of Mathio mixture in respect of yield, ginning percentage and quality and the trial at Amreli of the early strains of Wagad evolved at Viramgam with a view to replacing, if possible, inferior Mathio by early *herbaceums*. The scheme came into operation in June, 1937. In January 1942, it was extended for five years from 1st June 1942, and in August 1946, for a further period of 5 years from 1st June, 1947. As a result of the work done under the scheme, an improved variety (subsequently named Pratap) was produced in 1938. During the year under report, a large scale varietal trial to compare the yield of Pratap with Mathio Local was arranged at Amreli farm. Mathio local gave a significantly better yield than Pratap. The latter, however, gave a higher ginning percentage and possessed a long staple than Mathio. The previous year's spinning report showed that it spins 26's against 13's of Mathio.

Four families from the cross (520 x Pratap) and its back cross were tried along with 5 sibs of H. 415 and Pratap as control, in six randomised blocks. Five progenies appeared to be promising and they will be tried further. Five families, from Amreli *viz.*, (C. P.)-19, P(C. P.)-22, C (C. P.)-24, P (C. P.)-28, H. 415 and three more strains from Jalgaon were tried in small bulk trial along with Pratap as control. None of the Jalgaon strains proved better than Amreli selections in yield. Two of the families *viz.*, (C. 520 x Pratap)-19 and Pratap (C. 520 x Pratap)-28 proved to be better than the remaining families and they are proposed to be further tested next year.

Fifteen fresh single plants were selected from local Mathio all over Kathiawar and were tried in randomised blocks against Pratap. Out of these, four best progenies were retained for further trial.

EAST PUNJAB.

(a) **Scheme for improvement of cotton of south-eastern districts of the Punjab.**—This scheme is an off shoot of the Punjab Botanical Scheme. It was sanctioned by the Committee in July 1944, for a period of five years. The scheme came into operation at Hansi on the 1st March, 1945. In August 1946, an extension of the scheme was sanctioned for a period of 3 years from the 1st March 1947, and a further extension of 5 years was sanctioned by the Committee in October 1949.

The object of the scheme is to replace the area under *desi* cotton by high quality American cottons in the irrigated portions of the tract without, however, losing sight of the desirability of breeding improved *desi* types which will continue to be grown in certain parts of the districts in question.

The work so far carried out on *desi* and American cottons has yielded two improved strains (one of each type) which have, in the extensive trials carried out, proved superior to the existing local varieties. The improved *desi* strain, 231R, gave an average yield of 13.9 maunds of *kapas* and a ginning outturn of 41.7% against 11.98 maunds per acre and 38.3% ginning, respectively of the standard Mollisoni strain, M. 60 A. 2. The new American strain "Hariana" which has passed the experimental stage and has been approved departmentally for distribution in the tract, was tested again on the cultivators' fields. It was found to give a mean yield of 14.08 maunds *kapas* per acre against 12.09 maunds of the *desi* variety M. 60A2. It has a staple of 0.92" and a ginning percentage of 32.8 and it is capable of spinning 34's standard warp counts against 6's of Mollisoni.

During the year under review, 370 maunds of seed of "Hariana" were distributed. Two more American strains AC. 101 and AC. 102 are reported to be more promising than "Hariana", their average yield being 13.48 and 12.28 maunds, against 12.34 maunds and a ginning percent of 34 and 34.9 against 32.5% of "Hariana". In technological properties AC. 102 equals "Hariana".

A few new selections also appear to be promising particularly with regard to their ginning percentage which ranges from 35.8 to 37.2 against 31.5 of Hariana. Improvement in spinning capacity of Hariana is being taken up by crossing it with indigenous and exotic long linted American types.

(b) **Scheme for breeding of American cotton suitable for sub-montane districts of East Punjab.**—This scheme was sanctioned in November, 1947, and commenced working in October, 1948. Its object is to evolve American types of cotton capable of replacing the short-stapled *desi* at present grown over an area of about 72,000 acres in the sub-montane tract of the East Punjab comprising the districts of Jullunder, Ludhiana, Gurdaspur and Hoshiarpur.

Among the trials conducted to test the suitability of some American types evolved in the Punjab in the pre-partition period, 320F gave the highest yield of 19.37 maunds *kapas* per acre closely followed by J. 2 with 19.22 maunds yield. The ginning percentage of these types was reported to be 35.3% and 37.6% and their staple length 7/8" and 31.32" respectively. The Grader's evaluation of lint of 320F was at Rs. 1000/- per candy and that of J. 2 at Rs. 1,125/- per candy. Besides, it gave the highest yield in the tests conducted at Ludhiana and Gurdaspur also, the average *kapas* yield of this type recorded at these places being 14.75 maunds and 7.30 maunds per acre, respectively. At Ludhiana it out-yielded the local *desi* cotton by a difference of 4.25 maunds per acre, while at Gurdaspur its yield was very nearly at par with the *desi* variety. In the village trials at Allawalpur and Sidhwan-Bet the American strain, 216F, was tested and this out-yielded the local *desi* cotton by a difference of 2.95 maunds per acre at the former place and 1.8 maunds per acre at the latter.

MADHYA PRADESH.

Scheme for improvement of cotton in Akola and Amraoti districts.—This scheme is an offshoot of the Madhya Pradesh Cotton Breeding Scheme which terminated on the 31st March, 1948. It was sanctioned by the Committee in November, 1947, and was put into operation from the 1st April, 1948. The object of the scheme is (1) to evolve somewhat late ripening improved strains of *desi* cotton, having a strong stem, with a staple length of 3/4 to 13/16 inch and ginning percentage of 34 to 35 and (2) to isolate improved strains of American cotton with a staple length of about 7/8" and ginning percentage of 33.

During the year under report, out of 87 progenies of *desi* and 93 of American cotton tested, only 14 *desi* and 12 American progenis were retained after detailed examination for further trials.

Thirty nine promising strains of *desi* cotton were tested against H. 420, Jarila and local Jodi in randomised replicated plots. Of these, 32 strains

Plate I

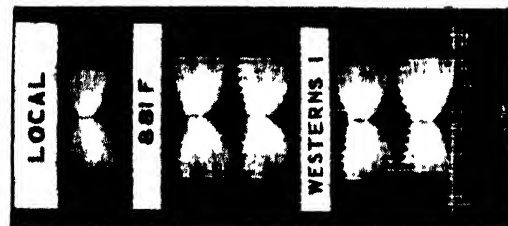
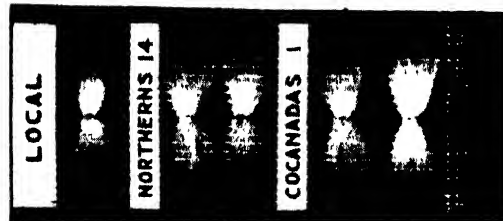


881F

(*G. arboreum* race *bengalense*)

Improved cotton strain for the Mungari tract, Madras State

Plate II



Improved *deca* Types Madras

were stated to be promising, one of them yielding significantly better than both Jarila and H. 420 and 10 others proving superior to H. 420.

Similarly, out of the 38 strains of American cotton tested against Buri 107 and local Buri, 27 were found to be promising, 5 being equal to both local Buri and Buri 107 in yield, and possessing a higher ginning percentage (*i.e.*, 33-38%).

In the varietal test with *desi* varieties at Akola, Jarila and Strain No. 091 were said to have given the best results. In the corresponding trial with American varieties, strain No. 0394 gave the highest yield. It has a ginning outturn of 35% against 28% of Buri 107.

In the varietal trials in the cultivators' fields with *desi* types, strain No. 91 gave, on the whole, the highest yield, and also the highest cash value per acre. In similar trials with American varieties, strain No. 0394 again gave the highest cash value.

MADRAS.

(a) **Scheme for improvement of Mungari cotton in Madras State.**—On the black soils of Anantapur, Bellary and Kurnool districts of the Madras State, cottons commercially known as Westerns and Northerns are grown. These are medium staple varieties, capable of spinning 24s to 32s counts. The type of cotton grown on the red and mixed soils, on the other hand, is that known by the name of Mungari, which is of course, a short staple variety, similar to Bengals, and not fit to spin more than 8s or 10s. The co-existence of varieties of widely different values favours undesirable mixing, with the result that the better cottons suffer in price. It is to overcome this difficulty that the Mungari scheme was sanctioned by the Committee in 1937. The object of the scheme was to evolve strains suitable to the red soils and combining the quality of the Westerns with the yield of Mungari. In January 1942 the scheme was extended for five years and in February, 1947, for a further period of three years.

The yield of 881F raised over an area of 62 acres during the year ranged from 300 to 350 lbs. of seed cotton per acre and its lint fetched a value equal to that of H1, Umri and Dharwar-American. Selections from Koilpatti and Adoni, when compared with 881F and local did not show any significant

difference in respect of yield but some of the former were superior to 881F in ginning outturn. In the trials with American varieties, cultures nos. 4116 and 4187 were found to be superior to local in yield while another 8, besides being equal in yield, were better in staple length. In the cultures tested in progeny rows, two, viz., 4274 and 4285 were not only equal to 881F in staple length and ginning but better than it in respect of yield. G. 4, M. 11 and 6106, with a staple of 23 mm. and 35% ginning were crossed with 881F for their resistance to stenosis.

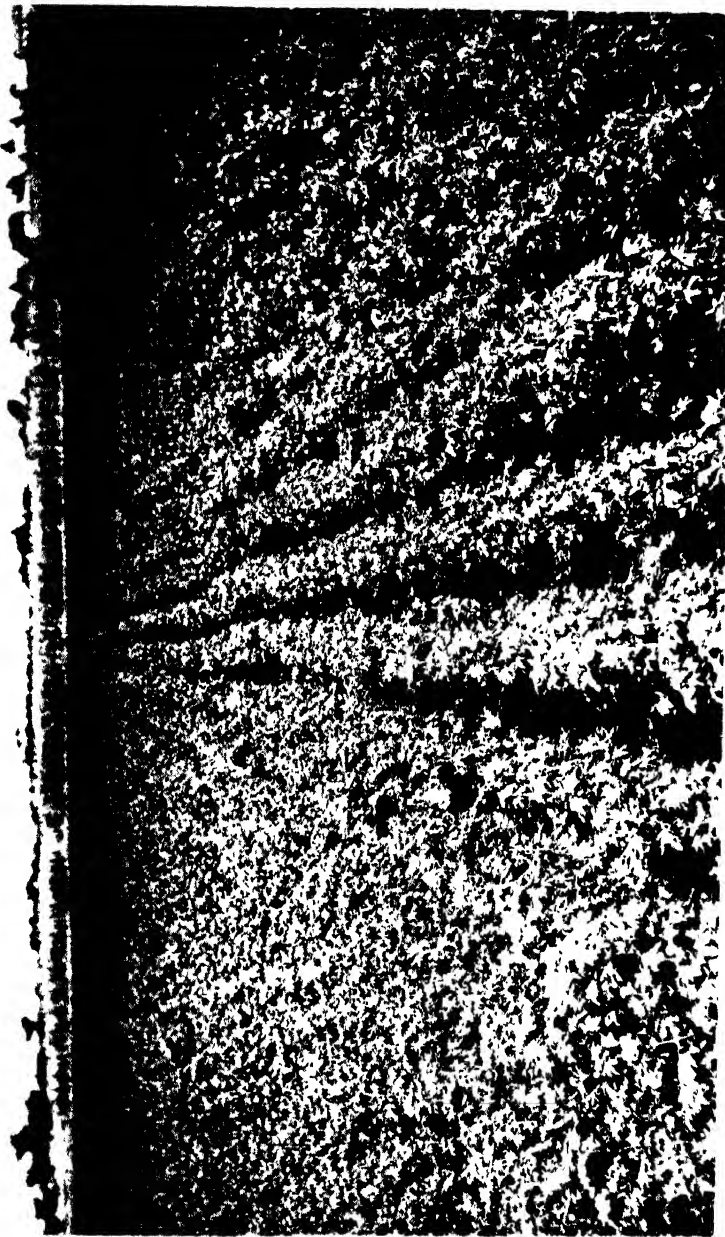
(b) Scheme for improvement of Cocanadas cotton in Madras State.— This scheme was sanctioned by the Committee in November, 1938, for a period of five years. The work was started from 1st February 1940. The object of the scheme is to improve the yield and ginning percentage of Cocanadas cotton, preserving at the same time the light pinkish colour of its lint owing to which it is in great demand for the manufacture of dyed yarns. In July 1944, an interim extension of 6 months from 1st February, 1945, was sanctioned and in January, 1945, a further extension of 4 1/2 years from 1st August 1945 was sanctioned.

During the year under report, the selection, 336B maintained its past good performance. It constitutes a definite improvement over the local in staple length, ginning outturn, spinning capacity and lint colour. It is also an advance over Cocanadas 1 (G1) in lint colour while retaining all the good qualities of G. 1. Two hybrids, viz., 2540 and 2545 and one pure line 336C2 are said to have been found better than G. 1 in colour and length of staple and in ginning outturn.

881F and 197-3 were found to be the best varieties for Chinnapati area. They are medium quality cottons with a high ginning outturn of 33% and a spinning value of 27's H. S. W. C. 881F yielded as much as local in a trial in cultivators' holdings.

(c) Scheme for breeding Cambodia cotton in ceded districts in Madras State.— This scheme was sanctioned in July 1944 for a period of five years. It was put into operation with effect from 1st April, 1945, and was extended for a further period of five years in October 1949. The objects of the scheme are (1) to evolve a long staple American variety capable of giving good yields when grown as an irrigated *rabi* crop, and (2) to breed an exotic type suitable

Plate III



Cambodia cotton crop Ridge planting.

Plate IV



Bullock-hoe for interculturing cotton crop.
(H. M. Goudak from Madras).

for cultivation in the unirrigated regions not served by the Tungabhadra project.

The work is conducted at three centres—Siruguppa, Hagari and Nandyal representing three distinct regions, viz., (1) irrigated black soil, (2) unirrigated black soil, subject to variable rainfall, and (3) unirrigated black soil, characterised relatively by heavy rainfall and early season.

During the year under report, the seasonal conditions were favourable for the cotton crop in all the three centres and good yields were recorded. However, in all the three centres, the crop matured three weeks behind the normal time.

In the irrigated trials at Siruguppa, M. A. II maintained its consistency in yield and jassid resistance but showed defects in boll opening, spinning performance and blackarm resistance. Two types from Latur, viz., II-42-8079 and LII-40-594 which had good records during the past two seasons continued to be outstanding in both yield and staple. Two Surat hybrids, viz., B. C. 125 and B. C. 68 were equal to HA 11 in yield and possessed a mean staple length of 29 mm. All Coimbatore hybrids except 9030, which is the best biotype for the southern districts, suffered from defective boll opening, soft lock formation and low fibre maturity. Reselections from MA II, HA 11 and Surat hybrids registered increases in one or more of the economic characters. Selection 2821 (MA II), 2806 (HA 11) and 2791 (B. C. 134) touched the 27 mms. mark in staple length. Culture 2814 (HA 11) bred true to its parental mean of 39% ginning and 27 mm. lint length. Two others, viz., 2196-4 and 1821-1-1 from interspecific hybrids were resistant to both blackarm and jassids. The crosses of MA II and HA 11 had the best adaptability while those having long staple Coimbatore varieties as one parent recorded the highest mean lengths. Deliberate late sowing was adopted to weed out jassid susceptible types using the criteria of leaf blight, mortality and nymphal counts. Twelve types other than MA II were found to have low mortalities compared to the HA 11 control. It was also reported that normal yields of 1600 lb. of seed cotton could be obtained from the late planted American by adopting close spacing and dusting the crop with D. D. T. and Gaemmaxene (5%) to check damage by

In the unirrigated trials, nine varieties were found equal to *desi* control in yield but better in quality and ginning. Among them, reselections from

G1 x Co. 2 at Hagari and from Co. 4/B15 at Nandyal, were the best. Good yields exceeding 300 lbs. seed cotton were obtained in cultivators' holdings in the districts of Bellary and Anantapur when HA 11 variety was planted on lands of average fertility in the month of August.

(d) **Scheme for production of long staple cotton in Madras State.**—This scheme was sanctioned in July 1945 and it came into operation in November 1946. The objects of the scheme are (a) the isolation of Upland strains longer than 1.1/16" staple and capable of maturing in 5.1/2 months and (b) the evolution of *barbadense* varieties suitable for cultivation in the coastal belts of South Arcot district.

The growth and progress of the crop during the season 1948 was generally very satisfactory. Unlike the previous year, the crop was sown in December-January instead of in March. Early sowing reduced the percentage of contabescence and the resultant shedding of flowers, which seriously affected the yield of the crop. The problem of defective seed filling, poor germination, reduced yield and poor quality of harvests may thus be solved by the simple agronomic practice of sowing early, and growing an early maturing variety like 7682.

In small bulk trials, forty four long staple cultures were found better than 7682 in yield and forty equal to it.

Fifty one select families were under family block trial with 7682 as the standard. Of these, eighteen families were found better in yield and thirty one equal to the standard.

Thirty seven cultures were under replicated progeny row tests and 66 under non-replicated tests. In the replicated rows, three cultures were found better than and thirty-four equal to 7682 in yield. Sixteen of these will be tried in family blocks.

UTTAR PRADESH.

Scheme for hybridisation in arboreum cottons.—This scheme was sanctioned in July 1943 and it came into operation on the 1st April, 1944. An interim extension of the scheme for a period of one year from 1st April 1949 was sanctioned in February 1949.

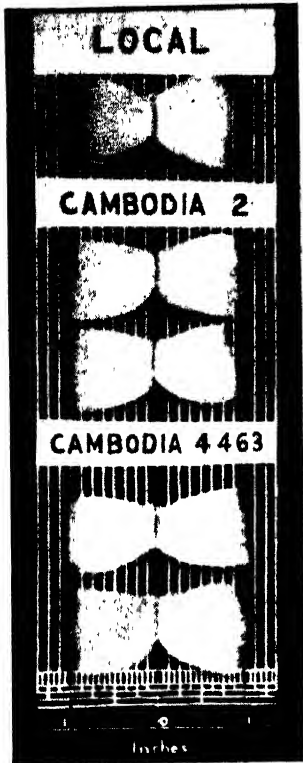


A general view of a crop of Madras Uganda 1 cotton at Chandivah
near Bombay Sown on 17-6-50. Photographed on 19-1-51



An individual plant of Madras Uganda 1.
(Rajapalayam cotton)
Sown on 17th June 1950.

Plate VI



Improved American Types.

The object of the scheme is to evolve strains of *desi* cotton, primarily for the rainfed areas of the State, which, while possessing the earliness, hardiness, yield and ginning qualities of C. 520 would be capable of spinning higher counts than the latter. This is proposed to be achieved by crossing some of the promising strains obtained under the United Provinces Botanical Scheme with superior quality cottons, such as Jarila, Verums, Indicums (Banis and Gaoranis), Shans and Million Dollars.

It would appear from the results obtained that as far as the object of improvement in quality in *desi* cottons is concerned, there is a considerable amount of material which has consistently, from F3 to F10 generations, shown marked improvement over C. 520 control in fibre properties and ginning. The material has already reached major trials stage at Research Farms, under irrigated conditions and has also shown promise under *barani* conditions at *Belatal* (Bundelkhand). More tests, however, have to be conducted under *barani* conditions in order to confirm those obtained last year.

In American cottons also, there is a good deal of material which is said to have consistently shown marked improvement in fibre properties and ginning outturn over Perso-American. Like *desi* cottons this material also has yet to be tested in Government Farms spread over in different cotton growing areas of the State. There is also a large amount of material both in *desi* and American cottons in preliminary stages of trial awaiting further examination and purification. The Committee, realizing the value of the material in hand and the importance of work in progress have sanctioned the separate regional schemes one for each of the three cotton growing tracts in the U. P., *i. e.*, Western U. P., Central U. P. and Rohilkhand.

ASSAM.

Scheme for improvement of hill cotton in Assam.—This scheme was sanctioned in January 1944 for a period of five years and it came into operation in February 1947.

The object of the scheme is twofold :—

- (1) Production of high yielding type of short staple cotton with high ginning percentage, and
- (2) Introduction of improved methods of cultivation.

In the first year (1947-48), 104 samples collected from all over the cotton growing tracts of Assam, such as Garo Hills, Naga Hills, Mikir Hills and Mismi Hills, Lushai Hills, Haflong Hills as well as from Tipperah and the Chittagong Hill tracts, were grown in small plots of 15 plants each. Selfing of flowers in all the plots was carried out for the maintenance of the purity of the samples.

During the year under report (1948-49), the seeds obtained from the previous year's crop were grown in the culture plot. Only 74 samples germinated.

The plant characters noted in each case were—(1) number of monopodia, (2) number of nodes, (3) plant height, (4) number of fruiting nodes, (5) shedding percentage, (6) leaf shape, (7) lint colour, (8) feel, (9) weight of *kapas*, (10) weight of seed and (11) ginning percentage.

The study of the different samples with respect to the above characters revealed that the samples from the Garo Hills, Mikir Hills and Naga Hills, approached the requirements of the scheme more than the rest. So the following selections made in them were retained for progeny row trial next year :—

Mikir Hills	..	154, 157, 158A, 160-1, 160-2, 163-2.
Naga Hills	..	14a, 14b, 14-1, 14-2.
Garo Hills	..	54-1, 57, 132-1.
Dafila	..	46-2-1, 46-2-2.
Chittagong	..	109.

HYDERABAD STATE.

(a) **Gaorani Cotton Improvement Scheme.**—This scheme, which is an off-shoot of the Hyderabad Botanical Scheme, was sanctioned by the Committee in July 1943, for a period of 5 years from the 1st April, 1944, and terminated on the 31st March, 1949.

The objects of the scheme were :—(1) production of suitable, fine quality wilt-resistant strains of *bani* cotton for the three different zones, viz., North-East, Central and South-West portions of the Gaorani Protected Area, and (2) evolution of a suitable Upland American strain for the highlands of Adilabad.



General view of Comilla cotton
(*G. arboreum* race *cernuum*)
field on a hill slope in Assam



Storing of Kapas in baskets prior to transport
to a ginning factory in Assam

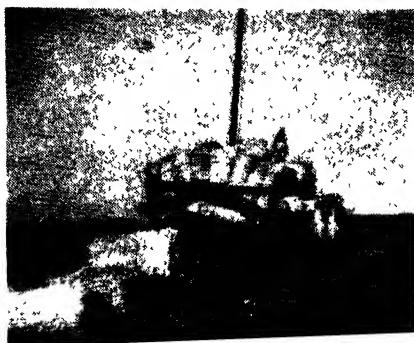


Plate VIII



Ploughing cotton field with an improved plough

Work in connection with the production of wilt-resistant types of Gaorani is being conducted at Parbhani as part of the newly sanctioned scheme for the improvement of Oomras cotton.

The work in connection with the scheme was located at Madhol, Nanded and Latur representing the north eastern, central and south-western parts of the Gaorani Protected Area. Preliminary work for the production of a suitable upland strain for Adilabad Plateau was carried out at Madhol. In addition, the agronomic experiments with cotton started in 1941-42 were continued.

The results achieved during the year show that the newly evolved improved strain Gaorani 12F-2 is superior to Gaorani 6 in the central zone and to the local variety in the south-western zone of the Gaorani Protected Area.

The results of the varietal tests and district trials conducted in the north-eastern zone indicated that the other newly evolved strain *viz.*, Gaorani 6E-3 is superior to Gaorani 6 in spinning performance and is similar to it in other respects.

Twelve fine quality strains bred at the Cotton Research Station, Nanded, in addition to being either superior or equal to Gaorani 6 in spinning qualities, are superior to it in one or more of the following characters :—

(1) fibre length, (2) ginning percentage, (3) boll size and (4) field resistance to *Fusarium* wilt.

Two sub-strains from Gaorani 6E-3 and two from Gaorani 6 have been found to possess greater field resistance to *Fusarium* wilt than the parent strains.

Three Gaorani cultures developed at Poona are stated to have practically attained homozygosity for 100 per cent wilt resistance.

The application of 20 to 40 lbs. of nitrogen per acre in the form of either groundnut cake or ammonium sulphate either by drilling or broadcasting at the time of sowing has been found to increase cotton yields.

The three year rotation, cotton—kharif jowar (or *mug* in *kharif* season and jowar in *rabi* season) and groundnut has been found to give higher cotton yields and higher gross money returns per acre than the prevailing two year rotation,

(b) **Scheme for improvement of cotton in Parbhani District.**—This scheme, which is an off-shoot of the scheme for improvement of cotton of Oomras tract in Hyderabad State, was sanctioned by the Committee in February, 1947, for a period of five years. It started functioning from the 1st April, 1947.

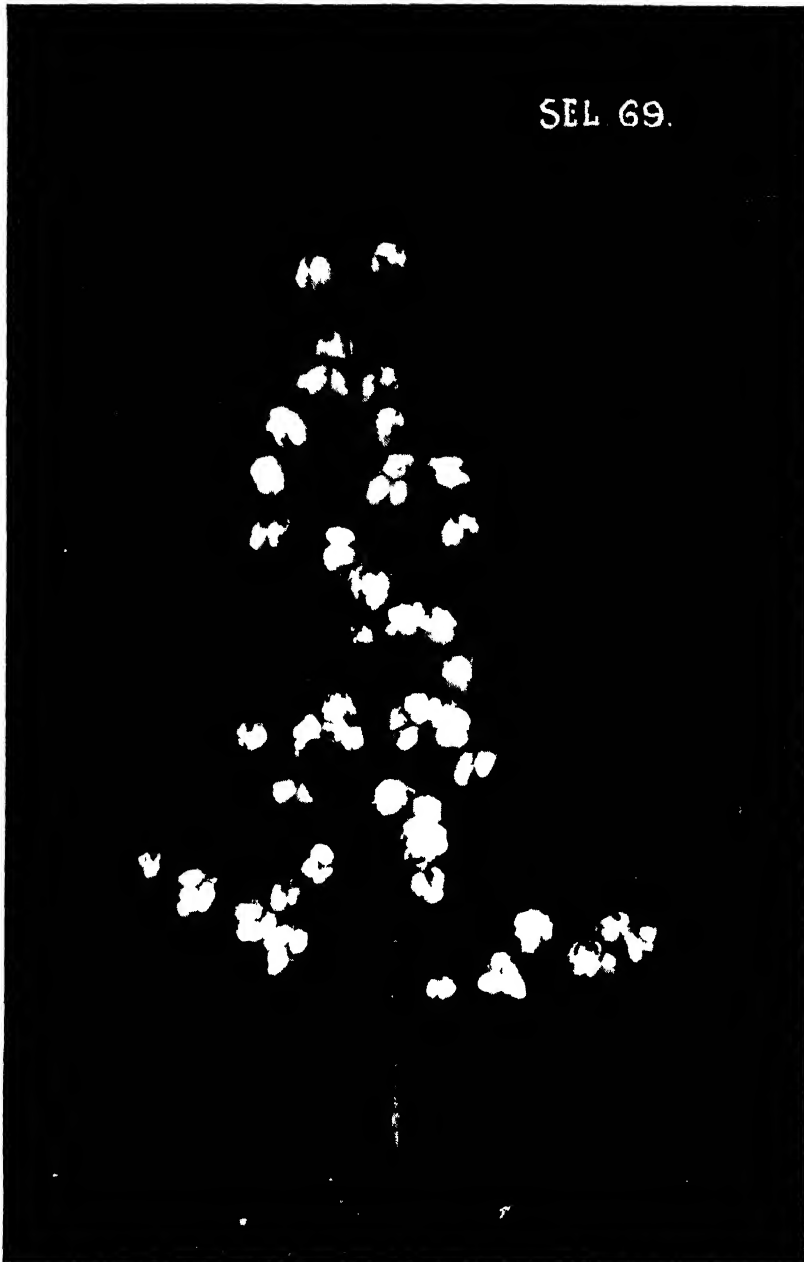
The objects of the scheme are;—

- (1) the production of a high ginning and wilt-resistant strain of G. 12-F-2 suitable for the entire district of Parbhani, if possible,
- (2) the production of similar other strains from basic material other than G. 12F-2,
- (3) the maintenance of the improved strains of American cotton bred for the *ghat* area of Aurangabad district,
- (4) the study of wilt-resistance of Gaorani strains in field conditions at Parbhani and under optimum conditions of temperature and infection at Poona, and
- (5) the carrying out of district trials of the improved strains against the local variety.

The following is a summary of the work done during the year under review :—

Efforts to produce a higher ginning and wilt resistant strain of Gaorani 12F-2 resulted in the production of ten strains. Of these, three strains, viz. 11-43-35, II-44-1231 and II-44-1290 were under trial in the cultivators' fields. Further, one sib each of Gaorani 6E-3 (II-42-7316) and Gaorani 12F-2 (II-44-1244) which are higher ginning and as good as Gaorani 12F-2 in spinning quality were retained for further trial. The latter variety was to be tested in the cultivators' fields in Parbhani District in the following season. Five strains obtained from the basic material other than Gaorani 12F-2 proved to be higher ginning than Gaorani 12-F-2 and fairly resistant to wilt. All of them were said to be suitable for the southern part of Aurangabad and Bhir districts. Three progenies of Gaorni 16C, viz., 6838-2-6-1, 6832-2-6-6 and 6838-2-6-10 were found to be homozygous for 100 percent wilt resistance. Two cultures from 6838-2-6-10 possessed desirable fibre characters and ginning percentage also. Further, two other progenies, viz., 6107-11-4-5-6-7 and

Plate IX

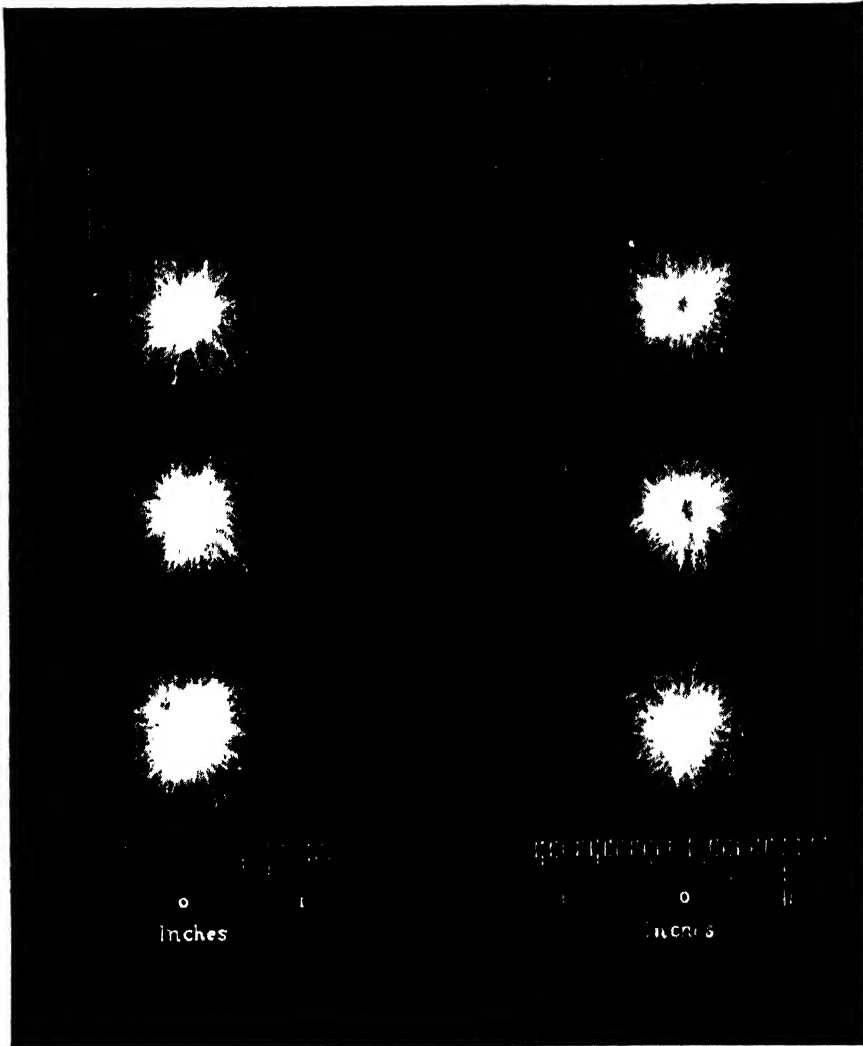


sel. 69

(*G. herbaceum* var *ascenifolium*)

An improved *desi* cotton for the rainfed black soil tract of Mysore State

Plate X



Halo length of scl. 69 and local *sanna* Hatt.

6634-4, were found to show very high resistance to wilt. In the district trials, Gaorani 12F-2 maintained its superiority in yield and spinning quality in Parbhani and Bhir districts.

MYSORE STATE.

Scheme for breeding Sea Island and Egyptian cottons in Mysore.—This scheme, which is an off-shoot of the Mysore (Doddahathi) cotton scheme, was sanctioned by the Committee in January, 1944, for a period of three years and was subsequently extended for a further period of three years.

It is concerned with (1) the acclimatisation and breeding of Egyptian and Sea Island cottons, and (2) the testing, in large-scale trials, of Mysore-American strains evolved under the Doddahathi scheme.

The seasonal conditions during the year under report were not very favourable for cotton cultivation, as the rainfall received was not only below normal but was also very unevenly distributed with the result that the cotton crop had to withstand long periods of drought.

A varietal and seasonal trial with all the Mysore Americans and Co. 4 laid out in March 1948 and 1949 with a reduced spacing of 2' between rows and 1 between plants, showed that M. A. 5 was the best in respect of yield. It was also found to be early maturing than the other strains except M. A. XI which was as good as M. A. 5 in this respect.

Irwin Canal Farm.—The observations of the previous years regarding the optimum season for raising a good crop of Egyptian are further confirmed. October and November sowings resulted in vigorous healthy plants with good opening of bolls. The local type, M. A. 5 gave higher yield in all the seasons of sowings. Amongst the Egyptians, Giza 12 gave the highest yield followed by Maarad, Giza 7 and Sakel.

Babbur Farm.—Seasonal and varietal trials indicated that sowings made during the months of May, June and July gave higher yields. During 1948-49 season, May sowings gave the highest yield and Giza 7 was the best type followed by Giza 12, Maarad and Sakel. A spacing trial laid out on the Babbur Farm with Giza 7 and 12 in May 1948 indicated that a spacing of $2.1\frac{1}{2}' \times 9''$ gave the highest yield. Of the 28 newly imported Egyptians and Anglo-Egyptian Sudan cottons tested during the year, seven varieties came up

well and the yields were as good as Giza 12 and Maarad. Several selections were made in these for further study.

The results of the seasonal trials with S. I. V. 135 confirmed the previous observations that the October sowings gave the highest yields and that as the season of sowing advanced the yields would get reduced. Hybrids between Egyptians and Sea Island cottons with M. A. 5, Co. 4 and M. A. II were under study during the year.

Co-ordinated crop weather scheme.—This scheme was sanctioned by the Committee in August 1946 for a period of 5 years and it came into operation in September, 1947. The object of the scheme is to study the effect of climatic factors on plant growth, crop yield and the incidence of pests and diseases over a series of years at experimental farms located at the following places :—

- | | | |
|-------------|--------------|---------------------------|
| 1. Kanpur, | 5. Viramgam, | 9. Coimbatore, |
| 2. Dharwar, | 6. Nagpur, | 10. Koilpatti, |
| 3. Surat, | 7. Amraoti, | 11. Parbhani (Hyderabad), |
| 4. Jalgaon, | 8. Akola, | 12. Indore, |
| | | 13. Baroda. |

The technical programme of the initial stage of the scheme in respect of cotton is on the same lines as that for the corresponding schemes sanctioned by the Indian Council of Agricultural Research and the Indian Central Sugarcane Committee. During the preparatory period, the initial work relating to the training of the headquarters staff and the observers at out-stations, setting up of the meteorological observatories and the laying out of the crop experiments at these stations, preparation and distribution of technical circulars and standard forms, etc., have been carried out. Four of the co-operating stations started recording the crop and weather data according to the scheme and sending them for analysis to Poona.

Scheme for improvement of cotton in Mewar.—This scheme was sanctioned in February, 1947, for five years and came into operation on the 16th June, 1948. The venue of the work of the scheme is Udaipur.

During the year under review, a comparative test was carried out for 18 American strains of peninsular India, and 55 single plant selections made locally during the previous season. The results showed that none of the extra pro-

vincial strains was better than the recommended strain Indore 1. Of the 55 single plant progenies, 24 were found to be promising.

Many single plant selections from different varieties and the F₂ hybrid material were made. These along with other promising selections are proposed to be tested in the ensuing season.

MADHYA BHARAT.

Work for breeding superior varieties of cotton for Malwa was continued during the year under report at the Institute of Plant Industry, Indore.

(i) **Evolution of a better strain of desi cotton for Malwa barani lands.**—A varietal trial consisting of seven strains and Malvi 9 as control showed that two bulks Nos. 3 and 7 A, designated as Malvi 10 and Malvi 12, respectively, which were found to be promising last year, maintained their superiority over Malvi 9. In addition, a large number of selections made in crosses of Malvi 9 with Jarila, C. P. Verums and Bani was found promising.

(ii) **Evolution of better strains of American cotton suitable for Malwa :—**A varietal trial with 5 new improved Indore strains, *viz.*, 2, 3, 4, 5 and 6 and three already established ones, *viz.*, Indore 1, Buri 107 and Parbhani-American 1, was conducted at Badnawar against M. U. 4 and Dhar Cambodia as controls in six randomised blocks. The results showed that the performance of Indore 3, a selection from Buri 107 x Co. 2, was promising.

Indore 2 cotton, which had proved superior in trials at Badnawur during the past three years, was grown in cultivators' fields with the co-operation of the Department of Agriculture, Madhya Bharat. The results obtained during the year corroborated the superior performance of Indore 2 over Dhar Cambodia.

Scheme for improvement of Nimar cotton in Central India.—This scheme was sanctioned by the Committee in February, 1947, for a period of five years and was put into operation in June, 1948.

The object of the scheme is to evolve a strain of cotton that combines the yielding capacity of the local Nimari with the ginning percentage, spinning quality and wilt-resistance of Jarila. This is sought to be achieved by making (1) single plant selections in Jarila, local Nimari and other strains

and (2) hybridising Nimari and Malvi strains with Jarila and Verum selections from Madhya Pradesh and other superior quality *arboreums*.

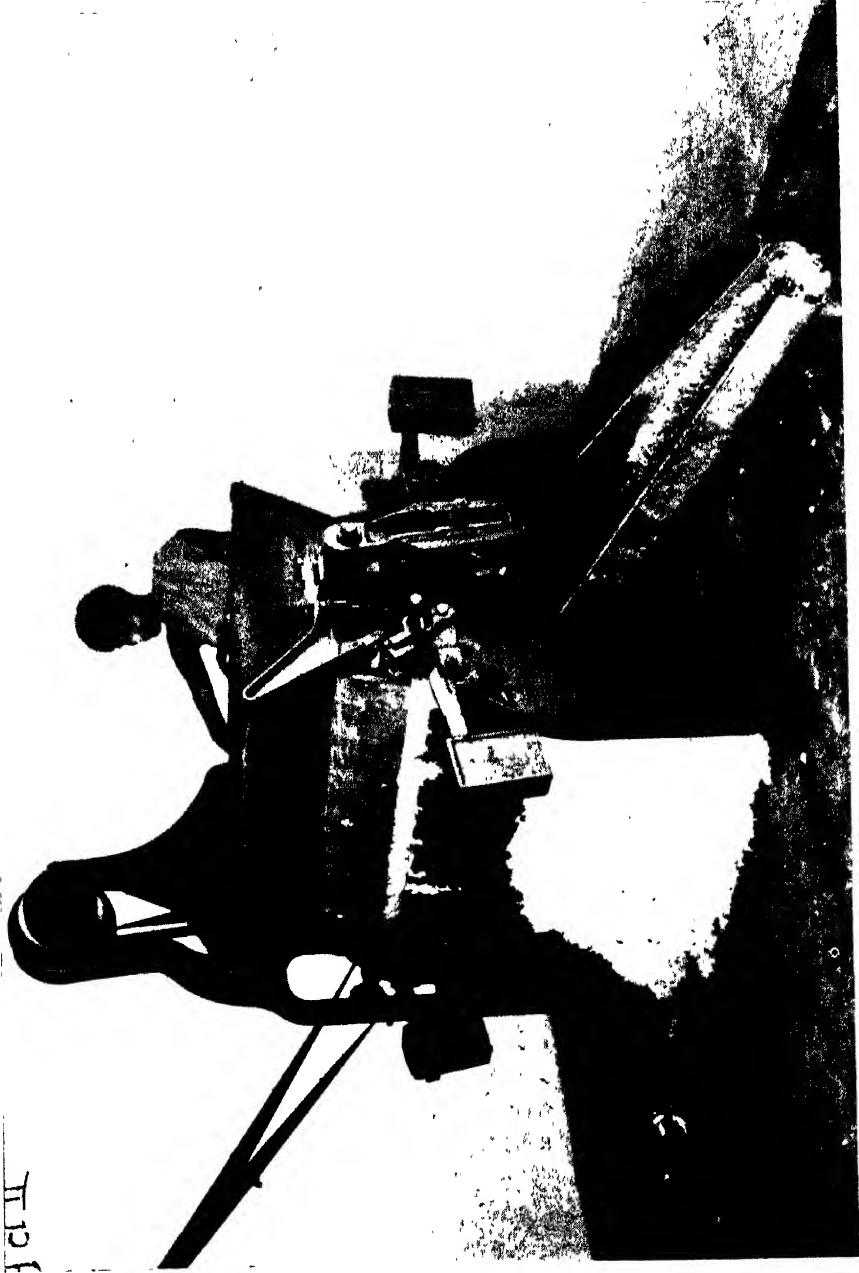
During the year under review, the experiments consisted of various yield trials of different strains made available to the scheme by the Institute of Plant Industry, Indore. It was noted that Dhamnode 2 and Dhamnode 3 needed further trials. Results of other experiments showed that a large number of promising progenies and strains are available. 300 fresh single plant selections were made during the year.

Plate XI



Kidney cotton on a hill slope at Chandivah near
Bombay sown on 2-6-1949 Photographed on 19-1-1951
Note the number of mature balls on the plant

Plate XII



Power driven double roller cotton gin.

CHAPTER IV.

EXTENSION WORK IN THE STATES.

The Seed Distribution and Extension Schemes of the Committee form the real link between the experimental station and the cultivator and in recent years increasing attention has been paid to the development of the extension work with the object of getting the grower to adopt the various improved practices and improved seed evolved as a result of the research schemes of the Committee. The total amount so far spent by the Committee on such schemes amounts to some Rs. 25.1 lakhs. During the period under review, there were 19 seed distribution and extension schemes in operation in the various cotton growing States. A brief report on the working of these schemes is given below :—

BOMBAY.

(a) **Jarila Seed Distribution and Extension Scheme.**—This scheme was sanctioned in March 1937, for a period of ten months in the first instance. It was extended in January 1938, for a period of one year, in November 1938, for three years and again in July 1941, for a further period of five years. In February 1947 the Committee sanctioned a further extension of two years from the 1st March, 1947 and in February, 1949 for another two years from the 1st March, 1949.

Its original object was to replace *Banilla* in the Khandesh tract with *Jarila*, which is wilt-resistant, over an area of some 155,000 acres. In view, however, of the general suitability of *Jarila* for the Khandesh area, the expansion now aimed at is 8,00,000 acres, out of a total cotton area of 1,100,000. The scheme was operated in five stages of which the first two were the Government Farms at Jalgaon and Bhadgaon. The seed produced at the Jalgaon Farm was used for further multiplication in the wilt-affected regions, and that at Bhadgaon Farm for the wilt-free zone of Khandesh. In January 1943, the Committee approved of the proposal to close down the seed farm at Bhadgaon and to transfer the seed multiplication work being done there to the Jalgaon Farm and the Mamurabad village adjoining it.

Stages I and II : The selfed seed from the previous year was sown on an area of 29.8 acres on the farm and 4,930 lbs. of seed were obtained for multiplication in stage II. The seed of stage II produced from 135 acres was 16,205 lbs. The produce of both the stages was ginned at the Farm and lint which was sold in 2 lots by auction at Jalgaon fetched Rs. 351/- per *boja* of 392 lbs. for cotton collected in the 1st picking and Rs. 325/- per *boja*, for cotton picked later, respectively.

Stages III and IV : Of the 35,54,070 lbs. of Jarila seed stocked by the Department and approved stockists, 23,05,290 lbs. were distributed for sowing and the remaining 12,48,780 lbs. were disposed of for feeding purposes. The controlled area during the year was 1,24,131 acres (including a reserved area of 46,974 acres). This acreage, however, fell short of the stipulated area of 5,50,000 acres by 4,25,869 acres, the reduction was attributed to the curtailment of the area under cotton. The total area under Jarila (including natural spread) was estimated at 2,47,739 acres against 2,29,929 acres last year.

It is estimated that the growers realised on an average Rs. 31/3/- per Bengal maund of *kapas*. It is also reported that arrangements made by the Co-operative Societies to hold auctions were not successful this year owing to restrictions imposed by the fixation of floor and ceiling prices. It was estimated that the farmers growing Jarila realised an additional income of Rs. 32,82,542 in comparison with what they would have earned if they had grown the local cotton.

For sowing in 1949-50, the Agricultural Department and approved stockists have stocked 42,13,978 lbs. of seed which would be sufficient to cover 2,26,905 acres, being the estimated area likely to be put under this cotton in 1949-50.

The Cotton Control Act has been applied to the whole of the Khandesh tract, making Jarila the prescribed variety for the tract. The Cotton Transport Act has been applied to the tract in so far as it relates to movement by rail, road and river.

(b) Revised Jayawant and Gadag No. 1 seed Distribution Scheme.— This scheme, which was sanctioned in August 1935, for a period of five years

replaced five seed schemes in the Southern Division of the Bombay Province, viz., the Hubli, Gadag, Athani, Haveri and Bailhongal schemes. It came into operation on the 1st June, 1936; in August 1940, it was extended for a period of one year and again in July 1941, for a further period of four years from 1st June, 1942. In August 1946, it was further extended up to the 31st May, 1948, and again in March 1948 for a further period of one year up to the 31st May, 1949. In February, 1949 it was again extended for a period of six months from the 1st June, 1949.

The original object of the scheme was to eliminate local mixtures and to extend pure Jayawant and Gadag No. 1 in the Southern Division of the Bombay Province, over an area of 9½ lakhs acres, within a period of five years. During the extension period of the scheme, it was proposed :—

- (1) to cover an additional area of 425,000 acres with Jayawant and 75,000 acres with Gadag No. 1.
- (2) to carry on intensive propaganda for the cultivation of improved cotton and to check the growing of inferior types ;
- (3) to have Jayawant and Gadag No. 1 pressed under departmental supervision and marketed under 'Agmark' ;
- (4) to make seed distribution work self-supporting by gradually reducing the subsidy on cotton distributed ; and
- (5) to entrust the work of the scheme to efficient co-operative organisations provided the working of the scheme was not adversely affected.

The scheme is operated from eleven centres for Jayawant, viz., Dharwar, Hubli, Nargund, Haveri, Bailhongal, Gokak, Athani, Bagalkot, Hungund, Bijapur and Muddebihal, and from two centres for Gadag No. 1, viz., Gadag and Ron. Decentralisation is the key-note of the scheme, the idea being that no single agency should have too big an area to cover or too great a responsibility to shoulder.

During the year under report the Department organized and rogued an area of 1,10,019 acres of Jayawant and 22,563 acres of Gadag No. 1. Owing to the 'Grow More Food' campaign, scarcity of rain and attractive prices

for food grains, all the seed stocked by the Department could not be distributed. In all, however, 43,527 bags (60,93,780 lbs.) of Jayawant and 14,682 bags (14,68,200 lbs.) of Gadag No. 1 seed were distributed to cover an area of 5,59,112 acres and 1,36,232 acres, respectively. The area under natural spread was estimated at 42,626 acres under Jayawant and 11,310 acres under Gadag No. 1, thus bringing the total area under Jayawant to 6,01,738 acres and that under Gadag No. 1 to 1,47,542 acres ; the corresponding figures for the previous year being 5,72,016 acres and 1,71,010 acres, respectively.

The produce of both the reserved and general areas amounting to 19,046 *docras* (1 *docra*—300/400 lbs.) of Jayawant and 11,097 *doeras* of Gadag No. 1 were sold by auction at an average premium of Rs. 14/8/- for Jayawant and Rs. 24/8/- for Gadag No. 1 per *nag* of 1,344 lbs. of *kapas* over the *bazar* rates.

The original programme was to stock 94,36,000 lbs. of Jayawant and 19,20,000 lbs. of Gadag No. 1 seed for sowing in the 1949-50 season. Purchases up to the 30th April, 1949, amounted to 30,21,200 lbs. of Jayawant and 7,68,700 lbs. of Gadag No. 1.

The agmarking was continued on an optional basis and up to the end of April 1949, 1599 bales of *Jayawant* were agmarked. It is believed, however, that unless the millowners show their appreciation of agmarking by paying adequate premiums for agmarked bales over the ungraded cotton, agmarking of cotton will not become popular.

(c) **Scheme for cultivation of 1027 A. L. F. cotton in Nawapur Taluka.** This scheme was sanctioned by the Committee in January 1942, for a period of three years and it came into operation on the 4th May, 1942. In January 1945, it was extended for a period of one year. The Committee was informed at that meeting that the total area under cotton in the taluka had decreased from 25,000 acres in 1942-43 to 18,300 acres in 1943-44 and to 16,000 acres in 1944-45 and that, of this, the area covered with pure seed of 1027 A.L.F. distributed by the Department was 10,000 acres. In February 1946, the scheme was further extended from 4th July, 1946, to 31st March, 1947, and in February 1947, for a further period of 3 years from the 1st April, 1947.

The original object of the scheme was to cover an area of 25,000 acres in Nawapur taluka with 1027 A. L. F. cotton. During the 1st extension period, it was proposed to multiply 1027 A. L. F. cotton in the controlled area so

as eventually to cover the whole area with this variety. During the present extension it is also proposed to study the results of the comparative trials with Suyog and 1027 A. L. F. with a view to selecting the better of the two for cultivation in Nawapur taluka.

A total quantity of 1,62,707 lbs. of seed was distributed during the year by the approved merchants. The total area under Departmental control was 4,272 acres of which 3,507 acres were certified. The seed obtained from this area was stated to be sufficient to cover the whole area of Nawapur taluka.

The results of trials of Suyog and 1027 A. L. F. conducted in Nawapur taluka indicated that Suyog is better in respect of yield and ginning percentage but inferior in spinning value to 1027 A. L. F. The question of replacing 1027 A. L. F. by Suyog had, therefore, been postponed till a final decision regarding the replacement of Suyog in the Surat cotton tract by another superior variety is arrived at.

The produce of the 1948-49 crop which was pooled and marketed by the cultivators under the guidance of the Agricultural Department realised an average premium of Rs. 3/4/- per *bhar* (924 lbs.) over the local. The average selling rate of seed cotton per *bhar* of Nawapur 1027 A. L. F. was stated to be Rs. 375/- against Rs. 390/- for Surat Suyog.

(d) **Scheme for multiplication and distribution of "Vijaya" cotton in Middle Gujarat.**—This scheme was sanctioned by the Committee in July 1943, for a period of five years and it came into operation on the 1st December, 1943. In September, 1948, it was extended for a period of five years from 1st December 1948.

The object of the scheme is to completely replace local Broach and B. D. 8 cottons by *Vijaya* cotton over an area of 5 lakhs acres in the Nerbudda-Mahi and the Mahi-Sabarmati zones of middle Gujarat.

During the year under review, the Agricultural Department controlled a seed multiplication area of 18,108 acres (including 1,858 acres grown with farm pedigree seed against an area of 19,349 acres (including 1,294 acres grown with farm pedigree seed) in the previous year. The total estimated area under *Vijaya* during the year was 2,14,566 acres (out of a total cotton area of

2,27,616 acres in Middle Gujarat) against an area of 2,10,600 acres in 1947-48. The total quantity of seed distributed by the Agricultural Department during the year was 7,66,475 lbs. against 1,51,335 lbs. in the previous year. In addition, the Co-operative Cotton Sale and Seed Supply Societies distributed 8,21,870 lbs. (against 8,56,970 lbs. of seed in the previous year) to cotton growers in parts of Broach and Kaira districts. The total quantity of seed thus distributed was 15,88,345 lbs. against 10,08,305 lbs. in the previous year. The usual rate of multiplication of the area under Vijaya in the tract is said to be 15 times. It is reported that due to the prevalence of famine conditions in the tract during the year under review, there was a great reduction in the production of cotton. In all, 2449 full pressed bales of pure Vijaya cotton were obtained and disposed of from the controlled area. It is stated that the trade having been fully convinced of the 'intrinsic' value of 'Vijaya' no difficulties were experienced in marketing it.

The additional income as a result of growing Vijaya was on an average estimated at Rs. 15/- to Rs. 20/- per acre.

(e) **Scheme for multiplication and distribution of Kalyan (K. 72-2) cotton in Ahmedabad district.**—This scheme was sanctioned by the Committee in February 1947 for a period of five years and it came into operation on the 1st April, 1947. The object of the scheme is to replace completely Wagotar cotton by Kalyan variety over an area of 330,000 acres in the Wagad tract of Ahmedabad district, comprising the talukas of Viramgam, parts of Sanand, Dholka, Dhandhuka and Deskroi.

During the year, 3,39,560 lbs. of Kalyan cotton seed was distributed to cover an area of 17,653 acres. It is, however, reported that due to insufficient rain at certain centres in Viramgam taluka, the actual area covered was only 12,057 acres, which, however, was more than the target of 7,945 acres originally programmed for. In addition 36,000 lbs. of cotton seed had been preserved to meet unforeseen contingencies.

Stages II and III were organized at Viramgam. It is stated that owing to insufficient rains at Viramgam no crop in that area could survive while the crop on one acre only could survive under stage II at Bavla. The produce of these two stages was purchased and the work of shelling the *kalas* (dry bolls with seed cotton), ginning and pressing was done systematically under de-

partmental supervision. The produce of stages IV, V & VI was purchased by the approved agents.

It is stated that 10,51,600 lbs. of cotton seed was produced in the year under report, of which some 96,000 lbs. will be kept as reserve material for use in an emergency. The remaining 9,55,600 lbs. were proposed to be distributed during 1949-50 to cover an area of 47,000 acres against 53,415 acres originally programmed for. The reduction in the area was attributed to the scanty rainfall and the consequent non-availability of enough seeds.

About 1,700 bales of Kalyan cotton were expected to be produced during the season and most of the bales which had been sold to the mills at Ahmedabad and Viramgam are stated to have realised a premium of Rs. 25/- to Rs. 30/- per bale over local Wagad.

It is estimated that the farmers growing Kalyan cotton on an area of 12,057 acres earned an additional income of Rs. 16,646/- in comparison with what they would have earned if they had grown the ordinary local Wagad.

(f) Scheme for multiplication and distribution of Suyog cotton in Surat tract (South of river Nerbudda).—This scheme was sanctioned by the Committee in July 1944 for a period of five years and it came into operation on the 1st April, 1945.

The object of the scheme was to replace 1027 A. L. F. and 1A cottons by Suyog over an area of 2 lakhs acres in the Surat tract of Bombay State lying South of the river Narmada, excluding Nawapur taluka of West Khandesh district.

During the year under report, the Agricultural Department controlled an area of 56,728 acres (against 49,165 acres in the previous year), out of which the produce of 42,999 acres was certified and agmarked. A total quantity of 9,94,593 lbs. of Suyog seed was handled and distributed by the Department (against 11,68,282 lbs. in 1947-48) including 15,028 lbs. from the Government Farm at Surat. In addition 1,64,874 lbs. were directly distributed by the Co-operative Societies.

The total quantity of seed thus distributed was 11,59,467 lbs. The number of pressed bales of certified Suyog cotton was 5,452 (against 14,432

in the previous year) of which 90 were agmarked with red labels (Pedigree) and 5,362 with black labels (Agmark certified). It is reported that owing to the higher seed-cotton prices prevalent in the market during the year, the societies and groups decided to sell seed-cotton instead of lint as was done hitherto. 6370 *Bhars* of seed-cotton were disposed of at a premium of Rs. 12/5/- per *Bhar* over non-certified seed-cotton.

MADHYA PRADESH

(a) **Scheme for distribution and marketing of Jarila cotton in Madhya Pradesh**—A small scheme for the distribution of *Jasila* seed, sufficient for 1,000 acres each in 17 *tahsils* and for roguing the area thoroughly, was sanctioned by the Committee in January 1943, for a period of one year. It came into operation in September 1943. The present scheme was sanctioned in January 1944 for a period of three years from the 1st March, 1944. In November 1947, it was extended for a period of two years. Its object is to arrange for the distribution of pure seed of *Jarila* in Berar, excluding the *Pusad taluq*, covering an area of two lakhs acres.

During the year under report, the Department distributed 4,588 maunds of pure seed of stages III, IV, V and VI to cover an area of 28,430 acres, against 9,983 maunds to cover 66,313 acres in the previous year. The reduction in area was attributed to (1) the susceptibility of *Jarila* to vagaries of season as late rains spoil the crop and affect the yield adversely and (2) the inadequate premium obtained. A total quantity of 2,404 maunds of seed is reported to have been secured for distribution in 1949-50.

It is stated that with the fixation of ceiling prices of cotton, the pooling organization run by the Department could not be operated during the year under report as the *kapas* fetched a much higher price in the open market.

It is stated that due to various adverse factors affecting the strain and the low premium obtained, the cultivators except in Buldana district were not able to realise any extra income.

(b) **Scheme for the extension of area under Buri and Cambodia cottons Madhya Pradesh**—The scheme was sanctioned by the Committee in March, 1948, for a period of one year, 1948-49. The object of the scheme was to increase the area under Buri & Cambodia cottons by 1,00,000 acres during 1948-49.

Districtwise particulars of the distribution of seed, the area covered and the estimated additional income realised by the growers during the year under report are given below.—

District.	Variety of cotton.	Seed distributed (Mds.)	Area covered (Acres.)			
			Depart-mentally.	Natural spread.	Total.	Estimated additional income.
			Rs.	Rs.	Rs.	Rs.
Nimar	Buri 107	5,982	30,000	29,000	59,000	2,36,000
Amraoti	Buri 107 & Cambodia.	4,827	23,804	63,996	87,800	25,13,275
Wardha	Cambodia	2,690	9,234	3,378	12,612	89,662

It is reported that the prices of *kapas* in the market were very much higher than those obtaining in the pools, which were on the basis of the ceiling prices fixed by the Government. This necessitated the suspension of the pooling activities until funds to the extent of Rs. 40,000 for subsidising the purchase of pure seeds were provided by the Government of India on the recommendation of the Indian Central Cotton Committee.

MADRAS.

(a) **Scheme for maintenance of nucleus of pure seed of improved varieties of cotton in Madras Province.**—This scheme was sanctioned by the Committee in January 1938 for a period of five years and came into operation on the 12th September, 1938. In July 1943, it was extended for a further period of five years for the maintenance of nucleus of the four strains, Co. 2, Co. 4, K. 1 and N. 14. In November, 1947, it was again extended for five years for the maintenance of nucleus of the five strains, Co. 2, 4706, Co. 3, H.1 and N. 14.

The area selfed and the quantity of selfed seed produced of each variety during the year under report are given below :—

Name of variety.	Area selfed.	Quantity of selfed seed produced.	How disposed of.
	Acres.	lbs.	
Co. 2.	0.80	114	After reserving sufficient seeds for the nucleus area of 1949-50 the rest of the seeds were transferred to the respective seed farms for sowing in the 'inner' area in 1949-50.
Co. 3.	1.09	234	
K. 2.	2.00	501	
H. 1.	2.00	326	
N. 14.	2.50	82	

(b) Scheme for multiplication and distribution of C—11-2 cotton in Coimbatore district of Madras Province.—This scheme was sanctioned in August 1946 for a period of three years. It came into operation on the 1st July, 1946, and terminated on the 30th June, 1949. The object of the scheme was to extend the cultivation of the improved strain C. 11-2 over an area of one lakh acres in the rainfed region of Coimbatore district.

During the year under review, the Department distributed 1,58,876 lbs. of seed to cover an area of 8,666 acres. The area under natural spread was estimated at about 12,400 acres. The ginning of the produce of the seed farm area is reported to be in progress and is expected to yield sufficient quantity of seed to meet the demands from the three districts of Coimbatore, Tiruchirappalli and Mathurai.

It is stated that, although, the Cotton Market Committee, Tirupur, had commenced to function, the imposition of control over lint only, resulted in the millowners buying *kapas* directly from the growers and getting it ginned themselves. About 1500 pothis (280 lbs. each) of such *kapas* are reported to have been purchased and these are stated to have realised a premium of 4% over local.

It was estimated that the growers of C-11-2 cotton earned an additional income of Rs. 52,500 spread over an area of 21,000 acres, in comparison with what they would have earned had they grown the local variety.

(c) Scheme for multiplication, distribution and marketing of Co. 4 Cotton in Madras Province.—This scheme was sanctioned by the Committee in February 1947, for a period of three years. It came into operation on the 1st February, 1948.

The object of the scheme is to cover the entire *masipattam* (summer crop) area in Ramnad, Mathurai, Tirunelveli and South Arcot districts of Madras State with Co. 4 cotton and also to arrange for the distribution of Co. 4 seed in the districts of Coimbatore, Salem and Tiruchirappalli for cultivation in cold weather.

It is reported that due to lack of sufficient pure and rogued seed the original target to run 400 acres of inner and 2,000 acres of outer 'seed farm area' during the year under report could not be reached. The actual area

covered was only 317 acres of inner seed farm and 980 acres of outer seed farm. A total quantity of 2,582 bags of seeds was purchased from seed farm *ryots*, who did their ginning under departmental supervision. A total quantity of about 9,000 bags of seed was expected to be procured for distribution in 1950-51, which was considered sufficient for covering the entire *masipattam* area.

It was stated that 5,000 candies (1 candy—784 lbs.) of lint of Co. 4 cotton were marketed during the year under report, on an average premium of Rs. 30 per candy over the local Cambodia.

(d) **Scheme for multiplication & distribution of G. I. Cotton in Guntur district of Madras Province.**—This scheme was sanctioned by the Committee in March, 1948, for a period of one year. In September 1948, it was extended for a period of two years. It came into operation on the 26th August, 1948. The object of the scheme is to replace the local cotton by the improved type G. I. in the Guntur district of Madras State.

It was stated that due to adverse seasonal conditions only 160 acres of seed farm area could be covered during the year under report against the target area of 300 acres. An area of 800 acres was expected to be sown during 1949-50. The estimated total area under 'G. I. during 1948-49 was stated to be 1,000 acres.

It was stated that 20,000 lbs. of *kapas* of 'seed-farm' produce was purchased by the millowners who ginned it themselves. A premium of Rs. 10 per *putti* of 500 lbs. of *kapas* is reported to have been realised.

It was estimated that the growers of G. I. cotton earned an additional income of Rs. 18,000 in comparison with what they would have earned if they had grown the local cotton.

EAST PUNJAB.

Scheme for multiplication and distribution of L.S.S. American Cotton in Ferozepore district, East Punjab.—This scheme was sanctioned by the Committee in November, 1947 for a period of five years and was put into operation on the 17th October, 1948. The object of the scheme is to establish L.S.S. cotton in the Ferozepore district and ultimately to make the district a 'protected' area for L.S.S. Cotton.

It was stated that the most important work done during the year was the purification of the L.S.S. variety. Produce from 35 acres of L.S.S. cotton grown at the Foundation Seed Farm, Abohar, was ginned under departmental supervision and 84 maunds of pure seed were obtained, which will be utilised in 1949-50 for further propagation at the Seed Farm, Abohar, over an area of 425 acres. 250 acres of L.S.S. were also grown at the Seed Farm, Abohar, with the seed of previous years. The produce from this area was ginned under departmental supervision and a total quantity of 759 maunds of seed was obtained for supply to "A" Class Registered Growers in 1949-50.

During the year under report, 9006 maunds of L.S.S. seed were purchased in the open market for distribution to growers. It is stated that upto May, 1949, 1091 maunds of seed had been disposed of. The entire lot of seed when disposed of is expected to cover an area of about 60,000 acres during 1949-50 against the estimated area of 37,300 acres during 1948-49.

It is reported that in auction sales, about 1200 maunds of *kapas* produced from the Seed Farm, Abohar, fetched a premium of Rs. 2 per maund of *kapas* over the commercial L.S.S. cotton.

BARODA STATE.

(a) **Scheme for distribution and multiplication of Vijaya cotton in Baroda State.**—This scheme was sanctioned by the Committee in January 1944 for a period of five years and it came into operation on the 1st April, 1944. It was extended in September, 1948, for a period of four years from the 1st April 1949. The object of the scheme is to establish Vijaya cotton in the whole of the Broach Cotton tract in Baroda State lying between the Narbada and Mahi rivers.

During the year under report, the Department sold 30,62,840 lbs. of seed to cover some 2,33,606 acres representing the total area under cotton in the tract. Of this 47,247 acres (4,155 acres of A grade and the balance of B grade), exclusive of the nucleus plot, were under Departmental control. It was stated that the total quantity of seed cotton pooled by the Department amounted to 1,39,488 standard maunds and that by cotton sale societies and unregistered groups of growers amounted to 54,324 standard maunds. The ginning of the crop was stated to have been completed in February-March. Eight thousand bales were given Agmark labels by the Department and a further

lot of 4,394 bales from the pooled produce of the Cotton Sale Societies and unregistered groups of growers was also agmarked. The premium obtained for certified over non-certified *kapas* was Rs. 4 per *bhar* of 924 lbs. and that for certified over non-certified lint Rs. 10 per candy of 784 lbs.

It was estimated that the farmers growing Vijaya cotton on the area of 2,33,606 acres earned an additional income of Rs. 46,72,120 in comparison with what they would have earned had they grown the local cotton.

(b) Scheme for distribution of Suyog cotton seed in Navsari district of Baroda State.—This scheme was sanctioned by the Committee in January, 1945, for a period of five years. It came into operation on the 1st April, 1945. The scheme aims at the replacement of 1027 A. L. F. by Suyog over the whole of Navsari district.

During the year under report, the Department of Agriculture, Baroda, sold 14,86,880 lbs. of controlled seed covering a total estimated area of 1,33,365 acres against 14,95,495 lbs. of seed covering 1,49,615 acres in 1947-48. Of the total area sown, 18,652 acres (1,882 acres of A grade and the remainder of B grade) were under departmental control. Ginning and baling of the season's crop were reported to be in progress at the end of the period covered by this report. During the same period 30,480 standard maunds of cotton were pooled and 2,189 bales were agmarked; the premia realised by agmarked bales being Rs. 10 to Rs. 15 per *bhar* (960 lbs.) over non-certified cotton (*kapas*).

The extra income which the cultivators of Suyog earned as compared with those who grew the ordinary mixture of Surti and Broach types in the neighbouring territory of the Indian Dominion was estimated at Rs. 14,00,332, from an area of 1,33,365 acres or Rs. 10-8-0 per acre. The cultivators whose produce was pooled and agmarked had earned a further sum of Rs. 10 to Rs. 15 per *bhar* (960 lbs.) of *kapas* as mentioned above. Thus the total gain to the growers of Suyog in one year (1948-49) was Rs. 14,27,694 against the Committee's contribution of Rs. 73,577 towards the cost of the scheme in 5 years.

MYSORE STATE.

Scheme for multiplication and distribution of Sel. 69 and M. A. 5. in Mysore. This scheme was sanctioned by the Committee in January 1945 for a period

of 5 years. The scheme came into operation on the 1st June, 1946. The object of the scheme is to extend the cultivation of (i) Sel. 69, an improved Asiatic cotton, in the black soil tract of the State covering an area of about 64,000 acres and (ii) Mysore-American, M.A.5., in the red soil tract extending from 16,000 to 20,000 acres, under rainfed and irrigated conditions.

Sel. 69.—Twenty pounds of selfed seed obtained from an area of 2 acres was utilised to raise a pure nucleus crop at the Babbur Farm. A total quantity of 160 lbs. of seed was collected for utilisation during 1949-50. The area under Sel. 69 during 1948-49 was estimated at 450 acres against 60 acres in the previous year. It was reported that *kapas* of Sel. 69 fetched a premium of annas eight per maund of 28 lbs. *kapas* over that of *Jayawant*.

M.A.5.—A total quantity of 1,44,500 lbs. of bulk seed was distributed during the year under report. The area under M.A.5. during 1948-49 was estimated at 5,700 acres against 3,000 acres in the previous year. A quantity of 1,51,200 lbs. of seed was collected up to May, 1949, and yet another 49,500 lbs. were expected to be collected for sowing in the next season. M.A.5. fetched a price of Rs. 13-4-0 per maund of 28 lbs. *kapas* against Rs. 10-8-0 per maund obtained by the local at Arasikere. It was stated that at Davanagere and Chitaldrug market the opening price of M.A.5. and local cotton which were Rs. 12-4-0 and Rs. 10-4-0 per maund came down to Rs. 10 and Rs. 9-4-0, respectively, due to the Movement Control Act on cotton passed by the Mysore Government.

MADHYA BHARAT.

Scheme for distribution of pure American cotton (Burl) seed in Nimar tract of Madhya Bharat.—This scheme was sanctioned by the Committee in February, 1949 for a period of two years. The scheme, however, was put into operation from the 2nd April, 1948. Its object was to cover an area of 28,000 acres with pure American cotton in 1948-49 and an area of 47,400 acres in 1949-50.

During the year under report, the Department distributed 6,107 maunds of seed to cover an area of 26,000 acres. The total quantity of cotton marketed was 6,959 maunds which fetched a premium of Rs. 10 per *mani* of 12 maunds.

It was reported that owing to the higher yield and price of Buri 107 cotton, the growers of this variety on an area of 26,000 acres earned an additional income of Rs. 4,16,000 in comparison with that they would have earned had they grown the local Buri.

CHAPTER V.

PROGRESS IN THE INTRODUCTION OF IMPROVED VARIETIES OF COTTON.

The area under improved varieties of cotton in the Indian Union during the year under review was estimated at 5,062,000 acres or 46% of the total cotton area as compared with 5,148,000 acres or 48% of the total area in the previous year. The improved varieties in cultivation were mainly of medium and long staple types as it is the policy of the Committee to increase the production of such cottons. The production of long, medium and short staple cottons in the Indian Union during the last 10 years is shown below :—

INDIAN UNION.

(In thousand bales of 392 lbs. net.)

Year (1st September to 31st August.)	Production (Based on official cotton forecasts).			
	Long staple (7/8" and above.)	Medium staple (Below 7/8" and above 11/16").	Short staple (11/16" and below).	Total.
1939-40	669 (18)	955 (25)	2,110 (57)	3,734
1940-41	717 (16)	1,249 (28)	2,505 (56)	4,471
1941-42	790 (18)	1,603 (36)	2,085 (46)	4,478
1942-43	735 (23)	1,397 (44)	1,037 (33)	3,169
1943-44	863 (23)	1,724 (47)	1,118 (30)	3,705
Average 1939-44	755 (19)	1,386 (36)	1,771 (45)	3,912
1944-45	465 (21)	1,101 (50)	656 (29)	2,222
1945-46	410 (19)	1,074 (50)	678 (31)	2,162
1946-47	404 (19)	1,043 (49)	721 (32)	2,168
1947-48	319 (15)	1,119 (51)	750 (34)	2,188
1948-49	310 (17)	987 (53)	567 (30)	1,864
Average 1944-49	382 (18)	1,065 (50)	674 (32)	2,121

N.B.—Figures within brackets indicate percentages to total production.

With the partition of the country in 1947, vast irrigated tracts growing large quantities of medium and long staple cottons were assigned to Pakistan. Despite this, the proportion of long staple cotton in the total production during the year under review was 17% against 15% in the previous season.

The figures of yield per acre of cotton based on two sets of data, viz., the official estimates of production and the estimates of actual crop calculated from cotton pressed, unpressed cotton consumed in mills, extra factory consumption, etc., are given in the following table for the last 10 years :—

INDIAN UNION.

Year (1st Sept. to 31st August.,	Area (Thousand acres.)	Production Government Estimates. (Thousand bales of 392 lbs. net.)	Yield per acre Col. 3. Col. 2. (lbs.)	*Approximate commercial crop. (thousand bales of 392 lbs. net.)	Yield per acre on the basis of commercial crop. Col. 5. Col. 2. (lbs.)
1	2	3	4	5	6
1939-40 ..	11,211	3,734	80	4,450†	96
1940-41 ..	19,661	4,471	89	5,151†	102
1941-42 ..	20,468	4,478	86	5,136†	98
1942-43 ..	16,090	3,169	77	3,324†	81
1943-44 ..	17,427	3,705	83	4,024†	91
Average 1939-44 ..	18,391	3,912	83	4,417	94
1944-45	11,413	2,222	76	2,734†	94
1945-46 ..	11,349	2,162	75	2,539†	88
1946-47 ..	11,671	2,168	73	2,549†	86
1947-48 ..	10,655	2,188	81	3,030	111
1948-49 ..	11,055	1,864	66	2,300**	82
Average. 1944-49 ..	11,229	2,121	74	2,630	92

* Best estimate of the crop as arrived at by the Indian Central Cotton Committee in connection with the annual *post-mortem* examination of official cotton forecasts.

† Separate details of India and Pakistan are not available and those for India given in the above table are based on the assumption that the actual crop figures for the two Dominions would be in the same proportion as the corresponding official estimates of production.

** Provisional.

It will be seen that the average yield per acre was about the same in both the quinquennia 1939-44 and 1944-49. The figures for earlier years for the Indian Union separately are not available. The low yield per acre in 1948-49 was due to the crop being affected adversely by untimely heavy rains in certain areas and by drought in others.

The main principle adopted by the Committee in making its recommendations for the spread of improved varieties of cotton is the extra income to the grower. On the basis of the data furnished by the various States in respect of the improved varieties, for the extension of which special seed distribution schemes were in operation, it is estimated that the additional income earned by the growers of improved varieties in the country during 1948-49 was about Rs. 4.37 crores.

The progress made in the introduction of improved varieties of cotton in the major cotton growing States is dealt with below :—

BOMBAY STATE.

The total estimated area under cotton in the State during 1948-49 was 2,142,000 acres, the average area for the quinquennium 1944-1949 being 2,080,000 acres and represents 18.5% of the all India cotton acreage. The total production during the year under review on the basis of the figures of cotton pressed and loose cotton consumed by mills is estimated at 4,80,000 bales.

There are seven cotton growing tracts in the State, viz., the Kumpta-Dharwar, Bijapur and Bagalkot Jowari, Barsi-Nagar, Khandesh, Surti, Broach and Dholleras.

Broach Tract.

The total area under cotton in this tract (including the merged areas of the former Baroda State) during the year was 6,41,671 acres. The improved variety under cultivation is "Vijaya" of which the estimated area was 4,48,172 acres against 2,10,600 acres in 1947-48. Of the total area under the improved variety 3,37,956 acres were sown with Departmental seed, for which 46,51,185 lbs. were supplied.

Waged Tract.

Out of the total area of 2,70,455 acres in North Gujerat and Mehsana and Amreli districts, the estimated area under the improved varieties, Kalyan,

Wagotar and Pratap was 12,094 acres, 20,000 acres and 193 acres, respectively. The quantities of seed distributed by the Department of Agriculture were 3,84,842 lbs. of Kalyan, 2,71,438 lbs. of Wagotar and 320 lbs. of Pratap.

Khandesh tract.

Jarila cotton is the principal variety in cultivation in Khandesh occupying 247,739 acres out of the total area of 2,50,900 acres under cotton in 1948-49. An area of 1,24,131 acres was under the supervision of the Agricultural Department which distributed a total of 22,82,532 lbs. of pure seed of Jarila. Owing to heavy and continuous rains in July and October, not only was the yield poor but the quality of the cotton was also not good. It is stated that due to this poor yield and the low price paid for Jarila in comparison with that paid for groundnut, this cotton variety lost a good deal of its former popularity.

The Cotton Control Act as well as the Cotton Transport Act remained in force during the year. Under these Acts, no other cotton but Jarila can be cultivated in Khandesh.

Surat Tract.

Against the total area of 2,85,400 acres under cotton, Suyog covered 2,83,402 acres. Of this, 2,13,402 acres were under the control of the Agricultural Department which handled 26,46,347 lbs. of pure Suyog seed. The produce of the controlled area was 'Agmarked' under the grading and marking scheme financed by the Committee and 5,452 agmarked bales were sold. The certified produce realised a premium of Rs. 12-5-0 per *bhar* (924 lbs.) of seed cotton over non-certified produce.

Under the scheme for cultivation of 1027 A. L. F. cotton in the Nawapur taluka of West Khandesh district the whole area under cotton in the taluka comprising 9,223 acres is now covered with 1027 A.L.F. for which the total quantity of seed supplied by the Department was 1,62,707 lbs. In all 617 agmarked bales of 1027 A.L.F. were sold, the average premium realised by certified over non-certified *kapas* being Rs. 13-7-0 per *bhar* (924 lbs.).

Kumpta-Dharwar Tract.

The total estimated area under cotton during 1948-49 in the three districts of Dharwar, Belgaum and Bijapur of the Bombay Karnatak and the Deccan States was 8,00,000 acres. Of the two improved varieties of cotton under cultivation in the tract, the estimated area under Jayawant was 6,01,738 acres

(5,59,112 acres being under Departmental seed) and that under Gadag No. 1—1,47,542 acres (1,36,232 acres being under Departmental seed). The total quantity of Jayawant seed distributed by the Department was 60,93,780 lbs. and that of Gadag No.1 14,68,200 lbs.

MADRAS.

The total estimated area under cotton in the State during 1948-49 was 1,498,000 acres, as compared with the average area of 1,539,000 acres for the quinquennium 1944-49. The cotton area of Madras in 1948-49 formed 14% of the total area under cotton in India.

There are six cotton growing tracts in the State, *viz.*, Cambodia, Tinnies, Northernns, Westernns, Cocanadas and Mungari.

CAMBODIA TRACT.

The area under Cambodia cotton during the year was 249,000 acres of which 192,827 acres were under improved varieties as shown below :—

Acres.			
Co. 2	..	..	142,267
Co. 3	..	..	14,160
Co. 4	..	..	35,980
No. 920	..	..	280
No. 4463	..	..	140

The total quantity of improved seed of Co. 2, Co. 3 and Co. 4 distributed by the Department was 663,504 lbs.

TINNIES TRACT.

The total area sown with Tinnies during 1948-49 was 473,000 acres, the estimated acreage under improved Karunganni strains Nos. 2 and 5 being 45,786 acres =(Karunganni 2=3215 acres and Karunganni 5=42,571 acres). The improved seed distributed by the Agriculture Department amounted to 323,272 lbs. (K. 2—14,683 lb. and K.5—308,589 lbs.).

NORTHERNS TRACT.

The estimated area under White and Red Northernns cotton was 80,000 acres, N. 14 the only improved strain covering an area of 2,372 acres.

WESTERNS TRACT.

The total area under Westerns cotton was 611,000 acres, the area under the improved strain H.1 being estimated at 3,88,580 acres.

COCANADAS TRACT.

The estimated area under Warangal and Cocanadas cottons was 73,000 acres, strain x 20, renamed G.1. or Cocanadas 1, covering an area of 360 acres only.

MUNGARI TRACT.

This is a small tract in the Westerns area, for which a new strain 881F. has been evolved under the Mungari cotton breeding scheme financed by the Committee. This new variety is still in the stage of district trials.

MADHYA PRADESH.

The total area under cotton in the State during the year 1948-49 was 3,002,000 acres and the production 342,000 bales. The average area during the quinquennium 1944-49 was 2,931,000 acres representing 26% of the total area under cotton in India.

The improved varieties, the tracts in which they are grown and the area covered by each in 1948-49 are given below :—

Variety.				Districts in which grown.	Area in acres in 1948-49.
(1)	Buri 107	..	..	..	56,522
(2)	Cambodia	..	..	..	117,137
(3)	Jarila	..	..	..	1,346,182
(4)	Verum	..	..	..	303,150
(5)	H.420	..	..	..	75,890
				Total	1,898,881

PUNJAB.

The total area under cotton in the Punjab was estimated at 237,534 acres, 192,673 acres being under *desi* and 44,861 acres under American cotton. The total production during the year was 75,000 bales. The American varieties constituted about 19% of the total Punjab crop against 21% in the previous

year. The average area under cotton in the State during the quinquennium 1944-49 was 340,000 acres representing 3% of the total area under cotton in India.

The improved varieties approved for distribution in the State, and acreage covered by each are given below :—

American variety.								Area covered in acres.
(1)	L.S.S.	..	..	..	..	..	..	34,087
(2)	4F	..	..	..	..	..	..	9,411
(3)	216F	..	..	..	..	..	..	983
(4)	Other American varieties			..	..	..	..	380
Deshi.								
(5)	Mollisoni	..	..	..	..	..	..	76,590

UTTAR PRADESH.

The total area under cotton during the year was 116,322 acres and the outturn 25,000 bales. The corresponding average for the quinquennium 1944-49 was 170,000 acres, representing 1.5% of the total area under cotton in India.

The improved strains in cultivation at present are two *desi* strains, viz., 35/1 and C. 520 and one American type, viz., Perso-American bred from American cotton types imported from Persia. The acreage and districts of growth of these varieties are shown below :—

Variety.				Total area covered in acres.	Districts of growth.
A. <i>Desi.</i>					
C. 520	..	..	..	3,464	Etah, Mainpuri, Aligarh, Mathura and Buldanschahr.
35/1	..	..	..	150	Meerut.
B. <i>American.</i>					
Perso-American	..	..		1,388	Muzaffarnagar, Meerut, Shahranpur, Buldanschahr, Aligarh, Mathura, Etah, and Moradabad.

The intention is ultimately to replace C.520 by 35/1 as pure seed becomes available in increasing quantities.

The unginued produce of Perso-American is reported to have fetched a premium of Rs. 1/8 to 2 per maund over *desi* cotton.

HYDERABAD.

The total area under cotton during the year was estimated at 2,161,000 acres and the production 294,000 bales. The average area under cotton in the State during the quinquennium 1944-49 was 2,083,000 acres representing 18.5% of the total area under cotton in India.

The improved strains under cultivation, the acreage covered by each and the districts in which they are largely grown are given below :—

Variety.	Quantity of seed distributed by Agriculture Department (lbs)	Area sown (acres.)	Districts in which the variety is grown.
Gaorani 6	3,988,510	215,498	Mostly confined to Nanded district.
Gaorani 6E-3	480,187	28,810	Nanded taluqa.
Gaorani 12	251,854	5,000*	Pattur and Kalan taluqs of Osmanabad district and Udgir and Ahmedpur taluqs of Bidar district.
Raichur-Kumpta 19 ..	688,41	3,092	Raichur taluqa of Raichur district.
Jayawant	42,562	4,256	Gangawati and Kopbal taluqs of Raichur districts.
Total ..	4,831,954	256,656	

* Due to disturbed conditions, the area under cultivation was greatly reduced.

MYSORE.

The total area under cotton during the year was 64,000 acres and the estimated production 17,000 bales. The average area under cotton in the State during the quinquennium 1944-49 was 61,000 acres, representing 0.5% of the total are under cotton in India.

The improved varieties grown, the acreage covered by each and the tracts in which they are mainly cultivated are given below :—

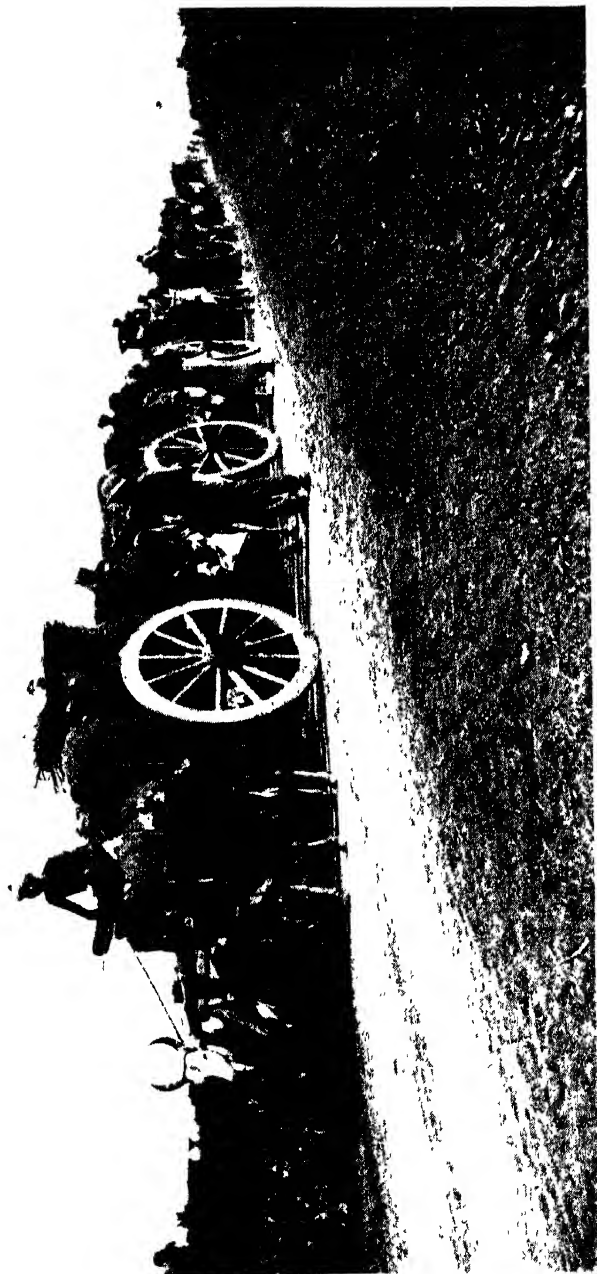
Variety.	Quantity of seed distributed by Agriculture Department (lbs.)	Area covered (acres.)	Tract in which the variety is grown.
M.A.5	200,776	5,700	Western part of the State comprising the districts of Shimoga, Chickmagalur (Kadur) & Hassan and Mysore.
Sel. 69	25,000	450	Northerns and North-Western districts of Shimoga and Chitaldrug.
Total ..	225,776	6,150	

PATIALA & EAST PUNJAB STATES UNION (PEPSU).

The total area under cotton during the year was 1,81,000 acres and the estimated production 59,000 bales. The average area under cotton in the State during the quinquennium 1944-49 was 202,000 acres representing 2% of the total area under cotton in India.

The crop in this State consisted almost wholly of mixed *deshi* varieties. The area under improved American types did not exceed 2,000 acres, and their cultivation was confined to the districts of Barnala and Bhatinda.

Plate XIII



Carting kapas, to the market

CHAPTER VI.

Cotton Marketing, Legislation and Other Protective Measures.

(i) Cotton Export Policy.

Exports of cotton were restricted to Bengal *deshi*, Mathia, Assams and Comillas during the last year. These restrictions were continued during the year under review upto the middle of March, 1949, when the position had to be reviewed in the light of the acute cotton supply situation resulting in Indian mills using even those short staple varieties of cotton not previously being consumed by them. In consequence, the Government of India decided on 16th March, 1949, not to grant any further licences for the export of raw cotton from India, except to hard currency countries. The exception was made in view of the difficult balance of payments position with those countries and the need for earning the maximum amount of dollars. Subsequently, on the recommendation of the Committee, the Government decided to permit exports of Assams and Comillas from the port of Calcutta to soft currency countries also from August, 1949, as these varieties are mostly exported and not generally used by Indian mills.

(ii) Exemption of Cotton, Cotton seed and Cotton Yarn from Sales Tax.

In response to the Committee's representation that cotton, cotton seed and cotton yarn should be exempted from the sales tax as was the case in Bombay State, the U.P. Government agreed to exempt raw cotton from the U.P. Sales Tax, from the 1st April, 1949.

(iii) Cotton Baling Hoops.

The arrangements for the distribution of cotton baling hoops were continued along the lines of the past year. During the year under report, some 6,351 tons of hoops were distributed to pressing factories in the country through the agency of this office working in conjunction with the Iron and Steel Controller. On the recommendation of the Baling Hoops Advisory Committee, the Government of India announced their decision not to fix any maximum rate for pressing cotton during the 1948-49 season, due to the varying rates of indige-

nous, English and American hoops, a short crop and a marked rise in the price of coal and wages of labour.

(iv) Other requirements of Ginning and Pressing Factories.

The arrangements for the supply of coal, under priority to cotton ginning and pressing factories on the recommendation of this office working in conjunction with the Textile Commissioner, Bombay, were continued during the season under report. The total quantity of coal recommended by this office for supply to ginning and pressing factories during the year amounted to about 93,240 tons. In addition, assistance was given to the factories in the matter of obtaining iron and steel required for maintenance and repairs.

(v) Dismantling of Cotton Ginning and Pressing Factories.

As in the previous years, this office continued to deal with applications for the grant of permission for the dismantling of cotton ginning and pressing factories, referred for opinion by the Textile Commissioner, Bombay.

(vi) Regulated Cotton Markets.

In the past, the Cotton Committee had recommended to the State Governments that they should establish regulated markets for the orderly and remunerative marketing of cotton. Accordingly, legislation for the establishment of regulated markets had been enacted in the States of Bombay, Madras, Punjab, Madhya Pradesh and Hyderabad and in the former States of Baroda, Indore, Chota Udepur and Sangli. In the year under report 53 regulated markets were functioning in the State of Bombay under the Agricultural Produce Markets Act. In the Punjab, under the Agricultural Produce Markets Act, 1939, there were 55 market committees working in 1948-49. The Act has been extended to 3 more areas where, however, market committees have yet to start functioning. In Madras, 3 regulated markets continued to function at Tirupur, Adoni and Nandyal. In the Hyderabad State under the Hyderabad Agricultural Produce Markets Act, 49 regulated markets functioned during the year under report as against 42 in the previous year. The markets continued to work satisfactorily.

(vii) Agmarking.

During the year, Agmarking of cotton bales continued at Hubli, Gadag, Bailhongal and Savanur as a guarantee of purity of cotton by affixing Agmark

labels to bales after supervision of its ginning and pressing by a special staff. A scheme with the aid of the Committee is in operation with a view to helping societies and growers to market 1027 A.L.F. and Suyog cottons in the Surat area under a guarantee of purity under the Agricultural Produce (Grading and Marking) Act, 1937.

(viii) Legislation to Maintain the purity of Cotton and other Protective Measures.

Several legislative measures have been passed by the Central and State Governments on the recommendation of the Indian Central Cotton Committee with a view to checking the spread of undesirable or inferior types of cotton, insect pests and diseases and malpractices in marketing. A brief account of the working of these measures during the year under review is given below. For more details, previous reports may be referred to.

(a) Cotton Transport Act.—The Cotton Transport Act, in so far as it relates to rail and road transport had been applied to the East Khandesh and parts of West Khandesh and Nasik districts of Bombay State in 1947. In the year under review these restrictions were extended to river transport as well. The Act continued to be in operation in the Kumpta Dharwar, Bagalkot and Bijapur Protected Areas.

(b) Cotton Ginning and Pressing Factories Act.

On the recommendation of the Committee, the Government of Madras have passed the Cotton Ginning and Pressing Factories (Madras Amendment) Act, 1948, providing, *inter alia*, for the prevention of watering, mixing and adulteration of cotton. The U. P. Cotton Ginning and Pressing Factories Act, 1949, passed during the year, contains similar provisions. The Committee has requested both the State Governments to enforce the provisions relating to mixing of cotton as early as possible.

(c) Prevention of Introduction of Foreign Cotton Pests.

In order to prevent the introduction into India of the Mexican Boll Weevil (*Anthonomus grandis*) with imported American cotton, at the instance of the Committee, regulations have been imposed by the Government of India under which the import of American cotton into India is prohibited except through the port of Bombay where it must be fumigated with hydrocyanic acid gas.

before entry into the country. The work of fumigation is carried out under the technical supervision of the Secretary, and the cost involved is met by the levy of a small fee from importers on each bale of American cotton fumigated. During the year under review 67,054 bales of American cotton were imported and fumigated.

The restrictions on the import of foreign *kapas* (unginned cotton) and foreign cotton seed remained in force throughout the year.

(d) Cotton Control Act.

Cotton Control Acts are in operation in the States of Madras, Bombay and Madhya Pradesh and in the former Baroda State.

The Madras Cotton Control Act had for its object the eradication of the short staple, 'Pulichai' cotton in certain areas growing improved varieties. The Bombay Cotton Control Act empowers the State Government to fix the standard varieties that can be grown in particular areas and to prohibit the growing, possession or trade in other varieties in these areas. The Act further provides penalties for the mixing of standard with prohibited varieties of cotton and of one standard cotton with another. The Central Provinces Cotton Control Act prohibits the cultivation, possession or trade in the inferior short staple Garrow Hill Cotton. The object of the Baroda Cotton Control Act is to establish one variety tracts.

K. SAWHNEY
Secretary

APPENDIX I.

MEMBERS OF THE INDIAN CENTRAL COTTON COMMITTEE.

- (1) *President*, Sardar Datar Singh, Vice-Chairman, Indian Council of Agricultural Research, *ex-officio*.

The Agricultural Commissioner with the Government of India, *ex-officio*.

- (2) Representatives of Agricultural Departments :—

<i>Madras</i>	Shri R. M. Sundaram.
<i>Bombay</i>	Dr. B. N. Uppal.
<i>Uttar Pradesh</i>	Dr. S. B. Singh.
<i>Madhya Pradesh</i>	Shri P. D. Nair.
<i>East Punjab</i>	Sardar Lal Singh.

- (3) The Director General of Commercial Intelligence and Statistics, *ex-officio*.

- (4) Representatives of Chambers of Commerce and Associations :—

The East India Cotton Association	Shri Purshotamdas Thakurdas.
The Bombay Millowners' Association	Shri Bhagwandas C. Mehta.
The Bombay Chamber of Commerce.. .. .	Mr. L. F. H. Goodwin.
The Indian Merchants' Chamber	Shri Chimanlal B. Parikh.
The Ahmedabad Millowners' Association	Manmohan Mangaldas.
The Tuticorin Chamber of Commerce	Mr. A. Mueller.
The Upper India Chamber of Commerce	Shri J. M. Heeramaneck.
The Empire Cotton Growing Corporation	Mr. C. P. Bramble.

- (5) Commercial Representatives nominated by Central Government :—

<i>Madhya Pradesh</i>	Shri R. V. Deshmukh.
	Shri Kishanlal Goenka.
<i>Madras</i>	Shri C. M. Kothari.
<i>East Punjab</i>	Shri Ram Narain Varmani.

- (6) Bengal Representative Dr. N. Dutt.

- (7) Co-operative Banking Representative Shri R. G. Saraiya

- (8) Representatives of Cotton Growing Industry :—

<i>Madras</i>	Shri A. K. D. Balarama Raja.
	Shri M. Lakshmikantha Reddy
<i>Bombay</i>	Shri F. B. Loxmeshwar.
	Raje J. R. Deshmukh.
<i>Uttar Pradesh</i>	Major Mohd. Jamshed Ali Khan.
	Lala Basant Lal Agarwala.
<i>Madhya Pradesh</i>	Shri S. K. Wankhede.
	Shri P. S. Patil.
<i>East Punjab</i>	Vacant.

(9) Representatives of Indian States and States' Unions :—

<i>Mysore State</i>	.. .. .	..	Dr. L. S. Doraswamy.
<i>Madhya Bharat</i>	.. .. .	..	Shri K. I. Thadani
<i>United State of Rajasthan</i>	.. .. .	..	<i>Vacant.</i>
<i>United State of Vindhya Pradesh</i>	.	..	Shri Narayan Dass Mukerjee
<i>Patiala & East Punjab States' Union</i>	.. .. .	..	Sardar Kartar Singh.
<i>United State of Kathiawar (Saurashtra)</i>	.. .. .	..	Seth Bhogilal M. Shah.

(10) Additional Members nominated by the Governor-General in Council :—

Shri Chunilal B. Mehta.	Dr. V. K. R. V. Rao.
Shri T. Vijayaraghavacharya.	Shri Biswanath Das,
Shri Shankar Lal.	Shri Bhawanji A. Khimjee.
Shri Padampat Singhania.	Mr. Neville Wadia.
Shri K. Sen.	Shri T. P. Barat.
Shri K. K. Chettur.	Shri G. B. Patel.
Shri P. H. Rama Reddi.	Shri R. Balasubramania Ayyar.
Mr. D. N. Mahta.	Mr. M. A. A. Ansari.
Pandit Thakur Dass Bhargava.	

APPENDIX II.

SUB-COMMITTEES.

Standing Finance Sub-Committee :—Shri R. G. Saraiya (*Vice-President*). Chairman ; Sardar Datar Singh (*President*) (*ex-officio*) ; Shri Purshotamdas Thakurdas ; Shri Chunilal B. Mehta ; Shri Chimanlal B. Parikh ; Shri Bhagwandas C. Mehta ; Mr. D. N. Mahta ; Mr. L. F. H. Goodwin and Shri P. S. Patil.

Local Sub-Committee :—*President* (Sardar Datar Singh) ; *the Vice-President* (Shri R. G. Saraiya) ; Shri Purshotamdas Thakurdas ; Shri Chunilal B. Mehta ; Shri Bhagwandas C. Mehta ; Mr. D. N. Mahta ; Mr. L. F. H. Goodwin ; Shri Chimanlal B. Parikh ; Raje J. R. Deshmukh ; Dr. B. N. Uppal and Mr. A. Mueller.

AGRICULTURAL RESEARCH SUB-COMMITTEE.

- I. *The President* :—Sardar Datar Singh (*ex-officio*).
- II. *The Vice-President* :—Shri R. G. Saraiya.
- III. *The Co-operative Banking Representative* :—Shri R. G. Saraiya (*ex-officio*).
- IV. *Cotton Growers' Representatives* :—Mr. C. P. Bramble, Shri S. L. Wankhede and Shri P. S. Patil.
- V. *Cotton Trade Representatives* :—Shri Purshotamdas Thakurdas, Shri Chunilal B. Mehta, Mr. A. Mueller, Mr L. F. H. Goodwin and Shri Kishanlal Goenka.
- VI. *Agricultural Officers* :—The Agricultural Commissioner with the Government of India (*ex-officio*) ; Mr. D. N. Mahta ; Shri R. M. Sundaram ; Shri P. D. Nair ; Shri P. H. Rama Reddy ; Dr. B. N. Uppal ; Dr. S. B. Singh ; Shri K. I. Thadani ; Sardar Kartar Singh ; Sardar Lal Singh.
- VII. *Additional Members* :—Shri T. Vijayaraghavacharya, Shri F. D. Loxmeshwar ; Shri R. Balasubramania Ayvar ; Shri S. S. Pande ; Shri G. B. Patel ; Mr. M. A. A. Ansari ; Raje J. R. Deshmukh ; Prof. R. H. Dastur ; Shri D. L. Sen ; Dr. V. G. Panse ; Shri P. D. Gadkari ; Dr. S. M. Sikka ; Dr. S. R. Barooah.
- VIII. *The Secretary, Indian Central Cotton Committee, (ex-officio).*

TECHNOLOGICAL RESEARCH SUB-COMMITTEE.

The President, Sardar Datar Singh (*ex-officio*) ; *The Vice-President*, Shri R. G. Saraiya (*ex-officio*) ; The Agricultural Commissioner with the Government of India (*ex-officio*), Shri Purshotamdas Thakurdas ; Shri T. Vijayaraghavacharya ; Shri Chunilal B. Mehta ; Mr. C. P. Bramble ; Shri Padampat Singhania ; Shri Shankar Lal ; Mr. D. N. Mahta ; Mr. L. F. H. Goodwin ; Shri P. D. Nair ; Dr. B. N. Uppal ; Shri R. M. Sundaram ; Shri Kishanlal Goenka ; Mr. A. Mueller ; Shri Bhagwandas C. Mehta ; Shri Pukharaj Kochar ;

Shri R. Balasubramania Ayyar ; Mr. M. A. A. Ansari ; Shri P. S. Patil ; Dr. K. Venkataram ; The Director of Industries, Bombay ; The Principal, Victoria Jubilee Technical Institute, Bombay ; Shri S. S. Pande ; Dr. V. G. Panse ; Shri D. L. Sen (Director, Technological Laboratory) ; Shri P. D. Gadkari ; Shri G. B. Patel ; Mr. Neville N. Wadia and Shri B. D. Kulkarni ; (Representing the Bombay Millowners' Association), Shri Jeykrishna Harivalladas and Shri Navnitlal Sakarlal ; (Representing the Ahmedabad Millowners' Association), Shri Madanmohan R. Ruia and Shri Jamnadas Ramdas ; (Representing the East India Cotton Association) and Shri D. L. Thoria (Representative of the Board of Scientific and Industrial Research.)

COTTON FORECAST SUB-COMMITTEE.

The President, Sardar Datar Singh (*ex-officio*) ; *The Vice-President*, Shri R. G. Saraiya ; The Agricultural Commissioner with the Government of India (*ex-officio*) ; The Director General of Commercial Intelligence and Statistics ; Dr. V. K. R. V. Rao ; the Director of Agriculture, Bombay State ; The Director of Agriculture, Madras State ; The Director of Agriculture, Uttar Pradesh ; The Director of Agriculture, Madhya Pradesh and Berar ; The Director of Agriculture, East Punjab ; The Statistical Officer, Department of Industries and Commerce, Madras State ; Shri Chunilal B. Mehta ; Mr. C. P. Bramble ; The Director of Land Records, Madhya Pradesh ; Mr. D. N. Mahta ; Mr. L. F. H. Goodwin ; Mr. A. Mueller and Dr. V. G. Panse ; The Director of Statistics Hyderabad Dn.

COTTON GINNING AND PRESSING FACTORIES SUB-COMMITTEE.

The President, Sardar Datar Singh ; *the Vice-President*, Shri R. G. Saraiya (*ex-officio*) ; Shri Chunilal B. Mehta ; Shri Purshotandas Thakurdas ; Shri Bhagwandas C. Mehta ; Mr. A. Mueller ; Mr. L. F. H. Goodwin ; Shri G. V. Doraiswamy Naidu ; Shri Pukharaj Kochar ; Dr. B. N. Uppal ; Shri P. D. Nair ; Shri Ram Narain Vamasi ; Shri J. M. Heeramanek ; and Shri D. L. Sen

Statement of Receipts and Payments for the Year ended 31st March, 1949.

* 3% Government of India Loan 1948-49, of the face value of Rs. 1,50,000/- have been deposited with the Imperial Bank of India, Bombay, as security against any overdraft that may be required by the Committee.

* 3% Government of India Loan 1948-49, of the face value of Rs. 1,50,000/- have been deposited with the Imperial Bank of India, Bombay, as security against any overdraft that may be required by the Committee.

Statement of Receipts and Payments for the Year ended 31st March, 1949—contd.

RECEIPTS.		PAYMENTS.	
Rs.	a. p.	Rs.	a. p.
Brought forward			
	55,11,521 15 11		
Closing Bal		C. C. Agri. 2.	
Current Bomb			
Imprest			
1. S			
2. D			
3. D			
4. D			
5. C			
6. P			
Suspense :			
1. C			
2. H			
B			
A			
E			
TOTAL ..			
	55,11,521 15 11		

@ Includes Rs. 28,571-2-0 on account of Sinking Fund.

We have examined the above Statement of Receipts and Payments of Indian Central Cotton Committee with the Books, Vouchers and Certified Returns of the Committee, have obtained all the information and explanation we have required and certify that to the best of our information and explanations received, the above Statement is a correct abstract of the figures appearing in the books and is drawn up in conformity with the Rules under the Indian Cotton Cess Act, 1923.

Sd/- S. B. BILLIMORIA & Co.
Chartered Accountants, Auditors.

Bombay, 19th August, 1949.

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TWENTY-NINTH
ANNUAL REPORT

INDIAN
CENTRAL COTTON COMMITTEE

FOR THE YEAR ENDED

31st AUGUST,

1950.

PRICE Rs. 2.

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INDIAN CENTRAL COTTON COMMITTEE

ANNUAL REPORT.

CHAPTER I

GENERAL

The Indian Central Cotton Committee was established by the Government of India in 1921, in pursuance of the recommendations of the Indian Cotton Committee of 1917-18, and this is its twenty-ninth Annual Report covering the period 1st September, 1949, to 31st August, 1950. At first, the Committee was purely a technical advisory body to Government on matters connected with cotton. In 1923, however, it was incorporated under the Indian Cotton Cess Act and provided with separate funds to enable it to undertake work for the improvement of the growing, marketing and manufacture of Indian cotton. These funds are derived from the levy of a cess on all cottons consumed in mills in India or exported from Indian ports. For the first three years after the passing of the Act, the cess was collected at the rate of annas four on every bale of Indian cotton consumed in Indian mills or exported and, thereafter, at the rate of annas two. Subsequently, as a result of the war and the consequent decline in exports, receipts from the cess dropped considerably and it became necessary for the Committee to fall back on its accumulated funds in order to finance its activities. The income of the Committee was further reduced by the partition of the country on 15th August, 1947, as a result of which the cess on exports of cotton from Pakistan as also on cotton consumed in Pakistan mills was lost to the Committee. This loss of income was made up to some extent by grants given by the Government of India from the Cotton Fund built up from the proceeds of the levy of an additional duty of one anna per lb. on all imports of raw cotton. However, it was felt essential that the Committee should be assured of a more regular income to enable it to carry out its future work and policy effectively. Accordingly by two successive amendments of the Indian Cotton Cess Act in 1947 and 1948, the cess was made leviable on *all* cotton consumed in Indian mills or exported from India with effect from 15th August, 1947, and the rate of the cess was raised from two annas per bale to four annas per bale from 10th September, 1948. The idea from the very beginning was that the Indian Central Cotton Committee should form a common meeting ground at which all sections of the cotton industry and the Agricultural Departments of all the cotton growing States in India would be represented and at which the cotton problems of the country would be discussed and measures for dealing with them suggested. It was

accepted at the outset that the cultivators' interests must be paramount in all matters considered and decided on by the Committee and that no permanent developments could take place unless they were in his interests.

The first task of the Committee was to arrange for a well-directed co-ordinated effort for the improvement of cotton in India from every aspect including the improvement of the race of the plant by scientific plant breeding. Grants were made to Departments of Agriculture in the various cotton growing States for specific investigations on cotton, in which improvement of the variety was naturally given high priority. It was and is the general policy of the Committee to supplement and not to supplant the work of the State Departments of Agriculture, and though, as a matter of convenience, certain lines of demarcation have been laid down regarding the investigations which the Committee considers most appropriate for its grants, assistance, as a general rule, is given in the directions where it is most needed.

Under the Indian Cotton Cess Rules, members, other than *ex-officio* members, hold office for three years and one-third of their number retire each year in rotation. The term of office of additional members appointed by the Governor-General under Section 4(x) of the Indian Cotton Cess Act is three years or such lesser period as may be specified in the notification appointing them. A list of members constituting the Committee indicating the various interests they represent, as on the 31st August, 1950, is given in Appendix I. The composition of the various Sub-Committees of the Committee as on the 31st August, 1950, is shown in Appendix II. The functions of these Sub-Committees have been described in earlier reports of the Committee.

The post of Secretary of the Committee in the year under review was held by Shri Kalidas Sawhney and that of Assistant Secretary by Mr. C. J. Bocarro.

The total receipts of the Committee up to the 31st March, 1950, since its inception amounted to Rs. 2,80,49,080|1|6, of which Rs. 2,22,95,664|1|6 represent collections from the Cotton Cess and miscellaneous receipts and the remainder special grants from the Government of India. The receipts during the year amounted to Rs. 11,16,098|7|7 and the total expenditure to Rs. 13,39,119|3|8. A statement of receipts and expenditure for the year as at 31st March, 1950, is contained in Appendix III.

Sardar Datar Singh (President), Shri R. G. Saraiya (Vice-President), Shri Chunilal B. Mehta, Dr. B. N. Uppal, Shri Chimanlal B. Parikh, Shri P. S. Patil and the Secretary represented the Committee on the Board of Governors of the Institute of Plant Industry, Indore, during the financial year ending 31st March, 1950. During the same period, Shri Chunilal B. Mehta represented the Committee on the Indian Council of

Agricultural Research. Under Article 51 of the Articles of Association of the East India Cotton Association, the Indian Central Cotton Committee is entitled to nominate from amongst its growers' representatives, three persons, whether members of the Association or not, not having dealings in forward contracts, as Directors of the Association. Shri A. K. D. Balarama Raja, Raje J. R. Deshmukh and Shri P. S. Patil were elected as the Committee's representatives on the Board of Directors of the Association for the cotton year 1949-50.

Two meetings of the Indian Central Cotton Committee were held in the year under report at both of which Sardar Datar Singh, President of the Committee and Vice-Chairman of the Indian Council of Agricultural Research, presided. The first meeting was held at Bombay on the 14th and 15th October, 1949, and the second on the 7th April, 1950.

The most important subject considered at the first meeting was the position arising out of the fixation of Floor and Ceiling prices of cotton by the Government of India for the 1949-50 season. After a lengthy discussion, the Committee unanimously adopted the following resolution:—

“The Indian Central Cotton Committee appreciates the action of Government in fixing higher differentials for quality in the floor and ceiling prices of cotton, but regrets to record that the basic ceiling price of Jarila cotton could not be increased. It would, however, like to impress upon Government the need for their taking sufficiently firm, and if necessary, drastic action to ensure availability to the mills of supplies of cotton at prices not exceeding the ceiling price and secure equitable distribution of such supplies. The Committee would also point out that the prices of imported cotton having become still higher after devaluation, it will be difficult to get the co-operation of the cotton grower in India to increase or even maintain the production of cotton in the country, and the question of raising the ceiling prices of Indian cotton may have to be seriously considered as a measure of practical necessity in order to maintain the production of cotton unless immediate steps are taken to arrest any tendency to rise in the cost of living. The Committee is further of the opinion that the Government of India should take steps to bring down the cost of living by progressive stages”. Another important resolution passed unanimously by the Committee was on the subject of Planned production of cotton:—

“This meeting of the Indian Central Cotton Committee has considered carefully the extremely serious cotton position arising from (a) the diversion of acreage from cotton to other crops, mainly food and groundnut (b) the partition of the country and (c) the devaluation of the currency accompanied by the high increase in the rupee price of foreign cotton. The Committee is of the view that India should be self-supporting in supplies of cotton of staple length

upto 1" in as short a period as possible and that for this purpose, the present annual production of three million bales should be increased by about one million bales, distributed amongst different Provinces, States and States' Unions as shown below:—

Province or State	Present production.		Suggested increase of production over 1949-50 estimates.
	Anticipated crop in 1948-49.	1949-50	
(In lakhs of bales)			
Assam	0.10	0.10	....
Bihar	0.09	0.09	....
Bombay	5.00	8.00	3.50
C. P. and Berar	3.70	5.01	1.80
East Punjab & Patiala & East Punjab States' Union	1.80	2.00	0.85
Madras	4.00	4.60	2.00
Orissa	0.01	0.02	....
U. P. & Rampur State	0.70	0.70	0.80
West Bengal & Tripura State	0.04	0.04	....
Ajmer Merwara	0.04	0.04	....
Delhi .. .. .	....	....	....
Hyderabad State	2.90	3.60	0.77
Madhya Bharat & Bhopal	2.40	2.60	0.20
Mysore	0.20	0.20	....
Rajasthan	0.80	0.80	0.20
Saurashtra & Kutch	1.22	2.20	0.50
Total	23.00	30.00	10.12

2. Every attempt should be made to increase the production by increasing the yield per acre and utilising fallow lands for cotton, wherever possible. As the Committee fully realises the difficult food position of the country, only the minimum acreage should be diverted from foodgrains to cotton, if necessary, and it also suggests that, where such diversion is inevitable, the Central Government should guarantee to make good to the Provincial and State Governments the short-fall in foodgrains. The Committee also recommends that the Government of India should give the same high priority to the growing of more cotton as the growing of more food, and should make available the required staff and funds to increase production *inter alia* by such aids as fertilisers, improved seed, and implements, including power implements, priority of transport, irrigation facilities etc.

3. The Committee further suggests that in order to make cotton growing more attractive to the grower, the price of groundnut (the most serious competing crop) should be controlled in the same manner as that of cotton".

Both the Resolutions were duly communicated to the Government of India.

At the 2nd meeting of the Indian Central Cotton Committee held in April, 1950, the subject of Planned production of cotton was further considered and after an extended discussion the following resolution moved by Shri R. G. Saraiya was passed by the Committee:—

“That in order to secure the achievement of the target for increasing the production of cotton, it is necessary to revise the ceiling prices of Indian cotton so as to bear some realistic relation to the price of competing crops like groundnut and also of the cost of similar varieties of foreign cotton which can be imported”.

The resolution was communicated to the Government of India.

CHAPTER II

COTTON STATISTICS.

During the year under report, the area under cotton in the Indian Union was estimated at 12,173,000 acres against 11,293,000 acres in 1948-49. The estimated production during the year was 2,165,000 bales against 1,767,000 bales in the previous year, thus showing an increase of about 22.5%. The increase occurred mainly in the States of Bombay, Punjab, Madhya Bharat and Saurashtra and is attributed mainly to more favourable weather conditions than in the previous year. In 1949-50, the climatic conditions were generally favourable to the crop in the entire cotton belt. In Punjab, an increase of 100% in the production was recorded, due to the increased acreage planted as a result of the progressive rehabilitation of displaced persons in the State.

INDIAN COTTON SITUATION, 1949-50.

The Indian Cotton Contract for September delivery had ceased to be traded in long before the maturity date owing to no cotton being available at the controlled ceiling price, with the result that there was practically no activity in the futures market till the commencement of forward trading in new crop on the 17th September, 1949. On the 12th September, the Government of India promulgated the Cotton Control Order 1949, prohibiting all ‘contracts’ and ‘options’ in cotton entered into or made after the issue of the Order, but under clause 6 of the Order empowered the Textile Commissioner to exclude from the operation of the clause any class or description of contract subject to such restrictions and conditions as he may prescribe. The Textile Commissioner issued general permission excluding *inter alia* forward contract from the operation of clause 4 of the Cotton Control Order and the Government of Bombay gave permission to the East India Cotton Association to trade in new crop contracts subject to the By-Laws of the Association. The trading commenced on the 17th September, 1949, when

February delivery of the Indian Cotton Contract was quoted at Rs. 606½ and May delivery at a discount of Rs. 11½/- on that day. The devaluation of the rupee and pound sterling and the rise of cotton prices in the foreign markets caused the local prices to firm up, with the result that the quotation for February and May deliveries at the end of September were Rs. 619½- and Rs. 612½ respectively. During the remainder of the year the quotations remained glued to the controlled ceiling price of Rs. 620½- per candy of 784 lbs. and there was practically no forward trading.

The statistical position of cotton in the Indian Union during 1949-50 was as shown below:—

	7/8" and above	Below 7/8" and above 11/16"	11/16" and below.	Total
	(In lakhs of	bales of 89½ lbs. net each.)		
1. Estimated carry-over at the commencement of the season i.e., on 1-9-1949.				
(a) With Mills.				
Indian Cotton	1 7	5.1	1 6	8 4
Foreign Cotton	4 0	0 2	—	4.2
(b) With Trade.				
Indian Cotton	0 7	1 9	1 0	3.6
Foreign Cotton	0 3	—	—	0.3
2. Production of Indian cotton in 1949-50 ..	6 7	7 2	2 6	16.5
3. Imports from foreign countries ..	5 9	17.1	6 7	29.7
3. Imports from foreign countries ..	12 5	—	—	12.5
Total supply ..	25.1	24 3	9 3	58.7
4. Mill Consumption.				
Indian Cotton	4 9	17 5	3 0	25.4
Foreign Cotton	11 2	0 2	—	11.4
5. Extra factory consumption	16.1	17.7	3 0	36.8
6. Exports	—	0.4	2.8	2.7
6. Exports	—	0.1	2 8	2.4
Total offtake ..	16 1	18 2	7 6	41.9
7. Estimated carryover at the end of the season i.e. on 31-8-1950.				
(a) With Mills.				
Indian Cotton	3.2	5.1	0.9	9 2
Foreign Cotton	5 0	—	—	5.0
(b) With Trade.				
Indian Cotton	0.2	1 0	0.8	2.0
Foreign Cotton	0.6	—	—	0 6
Total ..	9.0	6 1	1.7	16.8

STAPLE LENGTH OF INDIAN COTTON.

The classification of Indian cotton according to staple length was revised in March, 1948, in view of the marked changes that had taken place in the character of the crop in the preceding decade. The following staple length groups as approved by the Committee were also accepted by the Export Trade Controller and the Textile Commissioner, Bombay:—

Superior long staple—1" and above.

Long staple—7½" to 31½".

Superior Medium staple—13½" and 27½".

Medium staple—Below 13½" and above 11½".

Short staple—11½" and below.

The revised classification was given effect to in the Committee's Statistical Leaflet 'Report on staple length of the Indian cotton crop for the 1946-47 season.'

The official estimates placed the cotton crop of the Indian Union during 1949-50 at 2,165,000 bales of 392 lbs. net. The proportion of the crop falling under each of the above 5 staple length groups was 1.8, 13.7, 28.8, 25.7 and 30.0%, respectively, the corresponding figures for the previous season being 1.6, 16.3, 25.3, 19.7 and 37.1%, respectively.

STATISTICS OF STOCKS OF COTTON HELD IN THE COUNTRY.

The statistics of stocks of cotton held by the mills on the 31st August each year are collected by the Committee on a voluntary basis, direct from mills. The figures of stocks held by the trade on this date are collected with the co-operation of State Governments and trade bodies. To make these statistics as complete as possible, the Committee had recommended to the various State Governments, the introduction of legislation for the purpose. The Governments of Bombay, Uttar Pradesh, Madhya Pradesh, Punjab and Hyderabad, have accordingly passed the necessary legislation. Thus the census of stocks now covers the major part of the cotton growing area.

The statistics of stocks of Indian cotton held by the mills and the trade on the 31st August, 1949, showed that of the total mill stocks, viz. 837,000 bales, 20% were of long staple, 64 per cent, medium staple and 16 per cent, short staple. The corresponding percentages for the trade stocks of 316,000 bales were 13, 54 and 33 respectively.

As a result of the issue of the Cotton Control Order referred to in the last Annual Report, the stocks of cotton held by the trade on the 31st August, 1949, as compiled by the Textile Commissioner's office were about 2.95 lakh bales as against 3.2 lakh bales as compiled by the Committee. It was decided that the discrepancy should be reconciled. As

such discrepancy was due to duplication of the figures in the returns of stocks held by licensees, other than mills, submitted under the Cotton Control Order, necessary instructions were issued by the Textile Commissioner for avoiding such duplication.

DEMAND FOR VARIOUS TYPES OF INDIAN COTTON.

Statistics relating to receipts at mills and exports from the Indian Union of the various types of Indian cotton are collected direct from mills and exporters on a voluntary basis and published for general information during each season. The total receipts at mills of Indian cotton during the season under review were 2,570,000 bales of 392 lbs. net of which 18 per cent were of long staple, 73 per cent, medium staple and 9 per cent, short staple.

The statistics of receipts of foreign cotton are also collected simultaneously. The statistics collected during the last three years are given below:—

Types of foreign Cotton	Receipts at mills (1000 bales of 392 lbs net each).		
	1947-48	1948-49	1949-50
Pakistan American 280F types	153	304	74
Pakistan American L. S. S.	52	66	10
Pakistan American 4F	55	41	15
Pakistan Deshi	17	4	7
American (U. S. A., South American)	21	80	447
Egyptian	253	432	391
East African	171	224	288
Others (Sudan, Afghan, Burma, etc.)	87	62	48
Total ..	809	1,218	1,280

EXPORTS.

Of the total exports of 212,000 bales as accounted for by voluntary returns from exporters, 5 per cent were of medium staple cotton and the rest short staple cotton. The official figure of exports during the season was 235,000 bales. The exports to the United Kingdom, Continent of Europe, United States of America and other countries formed 5, 40, 28 and 27 per cent, respectively, of the total. The corresponding figures for the previous season were 9, 55, 7 and 30 per cent, respectively.

MILL CONSUMPTION.

Statistics of cotton consumed in mills in the Indian Union based mainly on returns received from mills under the Indian Cotton Cess Act are compiled and published every month. These returns are supplied on a compulsory basis by the mills in Part A States (*viz.* Bombay,

Madras, Madhya Pradesh, West Bengal, Orissa, Bihar, Uttar Pradesh and Punjab) and Part 'C' States (*viz*, Kutch, Bhopal, Ajmer and Delhi), while those from mills in Part B States (*viz*, Mysore, Hyderabad, Saurashtra, Madhya Bharat, Rajasthan, Patiala and East Punjab States' Union and Travancore-Cochin Union) are furnished on a voluntary basis. The question of the application of the Indian Cotton Cess Act and Rules to Part B States is under the consideration of the Government of India.

The mill consumption figures for the 1949-50 season, together with those for the previous year, are shown below:—

States.	1948-49			1949-50		
	Indian cotton.	Foreign cotton.	Total	Indian cotton.	Foreign cotton.	Total
		(In thousand bales of 392 lbs. net.)				
Part A States	2,626	1,088	3,664	1,929	1,086	3,015
Part B States	527	39	566	499	52	551
Part C States		*	*	142	22	164
Total Indian Union ..	3,153	1,077	4,230	2,570	1,160	3,730

* (Included under Part 'A' States)

UNPRESSED (LOOSE) COTTON STATISTICS.

Mills situated near cotton growing areas often use considerable quantities of ginned but unpressed cotton. The statistics for such consumption during the year under review, collected mainly from the returns under the Indian Cotton Cess Act are given below, together with the corresponding figures for the previous year—

States.	Unpressed (loose) Indian cotton consumed in mills	
	1948-49	1949-50
	(In thousand bales of 392 lbs.)	
Part A States ..	176	211
Part B States ..	49	65
Part C States ..	8	10
Total Indian Union	233	286

STATISTICS OF COTTON PRESSED.

During the year under review, 1,942,000 bales of cotton were pressed in the Indian Union against 1,441,000 bales in 1948-49. These statistics are incomplete owing to figures pertaining to Madhya Bharat not being available.

STATISTICS OF COTTON GINNED.

On the recommendation of the Committee, the States of Bombay, Madhya Pradesh, Uttar Pradesh, have amended the Cotton Ginning and Pressing Factories Act, 1925, to provide for the compulsory submission of returns of cotton ginned by cotton ginning factories. Some of the remaining Part A States and Part C States referred to earlier submit these returns under section 5-A of the Cotton Ginning and Pressing Factories Act. Accordingly these returns are received from the States of Ajmer, Kutch, Bhopal, Madras and Punjab. The submission of these returns is not in force in Part B States and the matter is under consideration of the State Governments concerned. The statistics for the 1948-49 and 1949-50 seasons, though somewhat incomplete, are given below:—

States.	Cotton ginned	
	1948-49	1949-50
	(Bojas of 392 lbs.)	
Bombay	186,057	315,748
Madhya Pradesh	385,261	317,322
Uttar Pradesh	362	1,447
Madras**	305,455	201,751
Punjab	*	72,431
Ajmer	12,954	14,275
Kutch	*	687
Bhopal	1,840	4,018

**Year ending 31st January.

* Not collected.

In 1948-49, the Committee recommended that the collection of statistics of cotton ginned and pressed classified by varieties should be taken up by the Directorate of Economics and Statistics; Ministry of Agriculture, so that such statistics may be compiled and published on an all-India basis. The Central Government's final decision on the question is still awaited.

IMPROVEMENT OF COTTON FORECASTS.

The cotton forecasts of the Indian Union for the 1947-48, 1948-49 and 1949-50 seasons were, as usual, subjected to a post mortem examination by the Cotton Forecast Sub-Committee. The actual crop of each season as compared to the crop estimated in the final cotton forecast is shown below:—

Year.	Actual crop.	Forecasted crop.	Percentage deviation of column 3 from column 2
1	2	3	4
	(In thous	and bales of 8	92 lbs.)
1947-48	3,080	2,159	29
1948-49	2,334	1,864	20
1949-50	2,927	2,165	26

The discrepancies in 1949-50 were mainly in the forecast estimates of the States of Punjab, Bombay, Madras, Madhya Bharat, Hyderabad and Mysore. The attention of the forecasting authorities was drawn to the discrepancies, with a view to their taking the necessary steps to improve the position in future forecasts.

SUPPLY OF MONTHLY REPORTS ON INDIAN COTTON TO THE INTERNATIONAL COTTON ADVISORY COMMITTEE.

The Committee's office as usual supplied, during the year, monthly reports on Indian cotton to the International Cotton Advisory Committee, Washington, covering stocks held by mills, imports of foreign cotton, consumption of cotton in spinning mills, exports of Indian cotton, crop estimates and pressings, cotton prices, despatches inland by rail of cotton piecegoods and their export, index number of wholesale prices and policy of the Government of India affecting raw cotton and cotton manufactures as announced from time to time.

CROP ESTIMATING SURVEYS ON COTTON.

A scheme for determining more accurately the average yield of *kapas* (seed cotton) per acre and the total production for the whole of the cotton area by the method of random plot harvesting has been in operation in Madhya Pradesh for some years. This investigation has also provided a scientific procedure for the formulation of the third, fourth and final yield forecasts. The State Government have now adopted this as an annual routine. The survey for 1949-50 covered 98.9% of the total cotton area of the State and the final forecasts based on the yield data obtained from the survey agreed closely with the actual crop. A crop cutting experimental survey, similar to that in Madhya Pradesh is also being conducted every year by the Department of Agriculture in the Bombay State from 1946-47. In 1949-50, the survey was conducted in 8 cotton growing districts and 9 talukas. As the question of merger of areas (comprising former princely States) in the Bombay State was not finally settled at the time of planning of the survey for 1949-50, the experiments could not be conducted in those areas. For the

first time, the results of the survey of the 8 districts were utilised for framing the yield forecasts of cotton. The forecasts for other areas were based on anna valuation as usual.

A scheme for conducting similar crop cutting surveys by random sampling method in the remaining cotton growing States is under the consideration of the Committee.

COST OF PRODUCTION OF COTTON.

The question of obtaining reliable data regarding the cost of production of cotton has been engaging the attention of the Indian Central Cotton Committee for some time. In April, 1950, the Committee approved of a pilot scheme for estimation of cost of production of cotton and rotation crops in Akola district of Madhya Pradesh, for a period of one year. The cost will be shared equally by the Indian Central Cotton Committee, the Indian Central Oilseeds Committee and the Indian Council of Agricultural Research, New Delhi. The scheme is expected to be put into operation in April, 1952.

PUBLICATIONS.

The following statistical publications were issued during the year under review:—

Statistical Leaflet No. 1. (Fifteenth Issue—1947-48) entitled "Report on the staple length of the Indian cotton crop of 1947-48 season."

Statistical Leaflet No. 5. (Eighth issue—1946-47) entitled "Report on the accuracy of the all-India cotton forecasts of 1946-47 season".

Statistical Leaflet No. 2. (Fifteenth issue—1947-48) entitled "Stocks of Indian raw cotton held in the Indian Union by the mills and the trade on 31st August, 1948."

Statistical Leaflet No. 3. (Fifteenth issue—1947-48) entitled "Receipts at mills in the Indian Union of raw cotton classified by varieties 1947-48 season."

Statistical Leaflet No. 4. (Fifteenth issue—1947-48) entitled "Exports by sea of Indian raw cotton classified by varieties 1947-48 season."

CHAPTER III

RESEARCH.

Most of the research schemes of the Committee are concerned with the improvement of the yield of the plant, and the quality of its produce, the object being to enable the grower to secure the maximum return. A number of research schemes, among which the most important are those for cotton breeding for the improvement of quality, is in operation in the various cotton growing States. While the majority of these schemes are financed entirely by the Committee, the cost of others is borne partly by the Committee and partly by the State governments concerned. The Committee also makes grants to Departments of Agriculture of the various cotton growing States for specific investigations on cotton. Since January, 1943, the expenditure on some of the new schemes and extensions of old schemes is being met from the Cotton Fund at the disposal of the Government of India. Research on cotton technology is carried on mainly at the Committee's Technological Laboratory in Bombay. In addition, trained Technological Assistants are posted at the Cotton Research Stations at Surat, Dharwar, Coimbatore, Indore, Nanded, Nagpur and Abohar to help the concerned cotton breeders in their work of producing improved varieties of cotton.

Technological Research.

Good progress has been made during the year in the investigation of various technological problems. Full advantage was taken by the breeders of this technique and the results obtained had proved to be of considerable help to them. The total number of samples received for various types of tests showed an increase in view of the keen interest taken by the breeders for evolving long staple strains. 1337 samples have been received this year as against 1207 in the previous year. 365 reports were issued as compared with 346 last year.

Another important advance was made in the standardisation of the ginning technique at all cotton breeding stations. Small samples of *kapas*, produce of single plants, single rows or of single plots have to be ginned by them. Hitherto there was no uniformity either in the method of ginning or in the machine used for doing so. A standard ginning technique was evolved at the Laboratory and recommended for adoption at all cotton breeding stations. For this purpose a small gin suited for use at cotton breeding stations has been perfected and will be supplied.

Further, a balance for the rapid determination of ginning percentage was also designed and supplied to the various cotton breeding stations. Indents for this balance were also received from abroad such as the Ministry of Agriculture, Egypt and Cotton Research and Industry Board, South Rhodesia, which were duly executed.

Another problem which was successfully tackled for the benefit of cotton breeders was the development of a standard method for the measurement of halo-length for adoption at all breeding stations. After conducting a series of experiments, a method was evolved which was approved in the Conference of Cotton Breeders held on the 6th April 1950. This method will now be recommended to all breeding stations for the sake of uniformity.

Satisfactory progress was recorded in many of the technological investigations. (1) The reasons for the difference in the spinning quality of the saw ginned and roller ginned samples of the same cotton were critically examined. It was observed that short and coarse fibres attached to the apical ends of seed were invariably left over in the case of seeds emerging from saw gin. This explains to a large extent as to why saw-ginning gives a lower ginning percentage and saw ginned lint is more regular in length and has a higher mean fibre-length yielding better yarn test. (2) The question as to whether cotton should have a pre-cleaning treatment before ginning or a crighton opening treatment after ginning is under investigation. (3) An apparatus to measure the strength of attachment of fibres to the seed was designed. (4) Tests carried out to find out the effect of storage on lint of Indian trade bales in upcountry centres and in Bombay had shown that the three varieties, Cambodia, Co. 2, Jarila and P. A. 124F, had not shown any sign of deterioration with respect to lea-strength even after storage for 2½ years. (5) The affinity of raw cotton towards direct and basic dyes depends on the presence of cellulose and other constituents which vary from cotton to cotton according to the degree of maturity. The effect of dyeing cotton with various direct and basic dyes with a view to find out whether it would be possible to assess the maturity of a sample by using such dyes is being investigated. It was found that broad differences in maturity could be detected by this method. Investigation is now being made whether by varying the concentration of dye or altering the conditions of dyeing, it would be possible to detect the smaller differences in maturity. (6) A method for predicting yarn strength from one twist-multiplier to another when spun into the same count has been evolved. (7) A systematic study has been made to assess the causes for the formation of neps in yarns. (8) Investigation on the influence of different length groups present in a cotton on its yarn strength had shown that the fibres in the regions of the model length contribute the maximum share to yarn strength. Several papers on cotton technology were completed and published during the period.

The scheme on the utilisation of some cellulose bearing materials (other than cotton) of India, financed by the Council of Scientific and Industrial Research terminated during the period. A paper on "Studies in the preparation of viscose and cellulose acetate from the pulps of

indigenous cellulosic materials'' has been sent for publication in the Journal of Scientific and Industrial Research.

Fundamental Research Work on Cotton.

Fundamental research on cotton is conducted at the Institute of Plant Industry, Indore, and a few other stations. The work done during the year under report is described in the following paragraphs:—

1. GENETICS.

(i) **Fuzz Colour:**—As in the previous year, the seeds with green fuzz, both in Buri 107 and local Cambodia, segregated into green and white fuzz grades. On the other hand, the white fuzz seed of Buri 107, instead of breeding true, produced both white and green seeded plants. This new observation is proposed to be investigated further.

A replicated trial (plot size 10' 2' — 20 blocks) was carried out to study the differences in the lint length and ginning outturn of plants grown from seeds with either green or white coloured fuzz. The following mean values for halo length and ginning percentage were recorded:—

Colour of fuzz.				Halo length m.m.	Ginning percentage.
White	..	..	..	25.8	80.8
Green	..	..	..	24.2	81.6
S. E.	..	..	..	0.68	1.00

The differences were not significant, but it was observed that, as in last year, the ginning percentage for green fuzz was relatively higher than that for white fuzz.

(ii) **Jassid resistance.**—The experiment for the study of association between economic characters and jassid resistance was repeated with the varieties Indore 1 and its jassid resistant substrain. The results obtained were as follows:—

				Halo length m.m.	Ginning percentage.
Jassid resistant substrain	..			24.5	27.6
Ordinary Indore	..			21.9	81.2
S. E.	..	..	..	0.97	0.65
C. D. at 5%	..	..	..	2.81	1.95

It will be noted that the resistant sub-strain again gave a lower ginning percentage than that of parental Indore 1. Unlike last year, however, the jassid resistant strain had a longer staple than the parental strain. This result needs confirmation.

Simultaneously with this experiment, the produce of a large number of jassid-free and attacked plants of different American varieties grown at the farm was examined and a similar trend, particularly in respect of ginning percentage was observed.

(iii) Interspecific hybridisation:—

A special scheme for the work of interspecific hybridisation has been in operation since 1938 at Surat in the State of Bombay. Its object is to obtain fully fertile hybrids between Asiatic and American cottons, combining the useful agronomic characters of both, and the good staple length of the American varieties with hardiness and adaptability of the Asiatic varieties.

During the year under review, 10 types derived from fertile backcrosses (obtained by backcrossing the sterile hybrids of 'American x Asiatic' cotton with American) were further tested against Suyog and Co.2. All of them were better in yield than Co.2 but only one of them viz., 134 x Co.2 x M possessed a longer staple (1.11" as against 0.84" of Co.2). As compared with Suyog, 7 of the new types were practically equal to it in yield. The ginning percentage of the 10 strains varied from 35 to 39 per cent. as against 36 per cent. of Co.2 and 39 per cent. of Suyog. In another experiment, three extra long staple types (staple length 1.02" to 1.12") yielded 25 per cent. lower than Suyog. Incidence of the attack of thrips was mild but the hybrid strains that showed greater resistance to the pest were late in maturity and had a relatively lower ginning outturn.

Some of the backcross derivatives of the above material were tried at Kopargaon and Padegaon (Deccan Canal Area) under irrigation and at Dharwar, Gagad and Boriavi (Kaira District) on Gorat land under rainfed conditions. The results showed that derivatives of 170 x Co.2 and 134 x CW, which have higher ginning percentage and longer staple than Co.4, have good yields. Derivatives of B.C. 68 and 134 x Co.2 x M particularly combine high ginning percentage with long staple (1.05" to 1.15"). However, these types are late maturing. Further selection for their improvement is in progress.

F.1 seed of Co.2 x Sea Island was grown on field scale at some places in Surat district under irrigated as well as dry conditions. In spite of the crop suffering from jassid attack, fairly good yields were obtained everywhere. The produce was adjudged as capable of spinning up to 80's standard warp counts in the Technological Laboratory, Matunga. Arrangements have been made for assessing their spinning capacity under mill conditions.

The work on inter-specific hybridisation was also continued at the Institute of Plant Industry, Indore. Progressive selection for fertility

in the inter-specific crosses, involving new world wild and cultivated species of cotton, was continued. As pointed out last year, 295 F₁-6 progenies from crosses of *G.thurberi* and *G.raimondii* with cultivated Asiatic (*arboreum*) and American species (*hirsutum* and *barbadense*) were grown during the year under report. Although most of the progenies bred true for foliage characters and had acquired a high degree of fertility, they still showed very considerable heterogeneity in various seed characters and staple length. Most of the progenies had more than 27 m.m. halo length.

(iv) Effect of agronomic factors on the yielding capacity of the seed:—

Small scale experiments conducted during the previous seasons at the Institute of Plant Industry, Indore, had indicated that the seed obtained from a widely spaced crop had a higher yielding capacity than that of the seed obtained from a normally spaced crop. In the year under review, a field trial was again carried out to check up this indication. However, it was found that the wider spacing of the parent crop did not improve the yielding capacity of the seed obtained from it.

2. PHYSIOLOGY.

(i) A special scheme for *Cotton Physiological Research at Indore* was sanctioned by the Committee in January, 1944, and has been functioning since then. Its aim is to obtain, as far as possible, precise knowledge of the inter-relationship between the soil and climatic factors and the growth for different varieties of cotton in irrigated as well as unirrigated areas and then attempt to apply this knowledge for improving the quality and yield of cotton.

During the year under report, the investigations on the effect of trace elements on the growth and yield of American cottons in Central India were continued. The results again showed that all the five elements, namely, chromium, zinc, manganese, copper and boron, gave significant increases in yield, varying from 16 to 27% over the normal yield. There was also a clear indication of the cumulative action of some of these elements. The effect of the application of copper and boron to the soil appeared to become more and more pronounced as the time advanced.

The study of the effects of the applications of five chemical hormones to the cotton plants showed that the effects produced by spraying 2, 3, 5—Tri-iodobenzoic acid and 2, 4—Dichlorophenoxyacetic acid were interesting. The first produced shortening of the internodes giving rise to bushy appearance of the plant and it increased the number of fruiting branches. The boll weight and yield were also higher in the sprayed plants than in the control. The second chemical had deleterious effects on the growth of the plant. This study will be continued with the main

object of finding out a method by which shedding of buds, flowers and bolls can be reduced.

The investigation pertaining to the red leaf blight of cotton confirmed the previous finding that 'red leaf' in Bombay Karnatak was produced by climatic factors whereas that in Central India was associated with nutritional factors. It was also observed that, as in previous years, the red leaf appeared in the Karnatak early in the season and almost disappeared at a later stage. On the other hand, in Central India, it appeared during the fruiting phase and persisted up to the end of the picking season.

A sowing date trial with Dharwar American cotton was conducted at Gadag to test the contention that one of the possible causes of the relatively low yield of cotton in Dharwar district was the shortening of the growth period due to the crop being sown late. The results showed that the sowing of 2nd September gave an yield of 11.57 maunds of *kapas* per acre as against 7.13 maunds and 3.33 maunds per acre for the sowings of 17th September and 2nd October respectively. It was also observed that the incidence of red leaf blight in the earlier sowings was not greater than in the later sowings.

The study of physical and chemical properties of the cotton soils of Mewar (Rajasthan) was continued. On the basis of the percentage of clay, the soils could be divided into heavy, medium and light. It was surmised that these soils, specially in Hurda and Bhilwara districts were suitable for the cultivation of unirrigated American cotton. In order to determine whether American cotton could be substituted for *desi* cotton in Mewar tract without any monetary loss to the cultivators, a number of experiments was carried out at Bhilwara, Kapasin and Hurda respectively. At all the three places, the yields of American and *desi* cottons were almost equal under rain-fed conditions. Post-monsoon irrigations gave only a slight increase in yield. Close spacing of 1 sq. ft. per plant was found optimum for American varieties. Manuring with nitrogen in the form of Ammonium Sulphate did not improve the yield of unirrigated cotton. Cottons sown before the monsoon and irrigated once or twice in the pre-monsoon period again gave a much higher yield than cottons sown with the onset of rains.

In the experiment on the inter cropping of groundnut with cotton, it was found that the yield of groundnut was not affected while the additional yield of 2 to 3 maunds of seed cotton was obtained from the mixed crop.

(ii) Co-ordinated crop weather scheme:—The object of the scheme is to study the effect of climatic factors on plant growth, crop yield and the incidence of pests and diseases over a series of years. The experimental farms at the following places were selected for the investigations:—

- | | |
|-------------|--------------------|
| 1. Kanpur, | 7. Viramgam, |
| 2. Indore, | 8. Nagpur, |
| 3. Dharwar, | 9. Amraoti, |
| 4. Surat, | 10. Akola, |
| 5. Baroda, | 11. Parbhani, |
| 6. Jalgaon, | 12. Koilpatti, and |
| | 13. Coimbatore. |

During the year under report, the work of training crop—weather observers, the checking and setting up of meteorological instruments and the analysis of data received from the different stations was carried out. It was found that flowering usually commenced before the completion of the elongation of the stem. It was also observed that (i) untimely rains received during the 'flowering phase' at Jalgaon, Akola and Parbhani depressed the yield and (ii) the crop at Coimbatore produced two flushes of flowers, one in mid January and the other in early April.

3. AGRONOMY.

(i) **Soaking of seeds in nutrient solutions:**—This work was carried out at the Institute of Plant Industry, Indore, and its object has been to study the effect of soaking cotton seed in nutrient solutions before sowing on its ultimate yielding capacity. The treatments included in the trial were soaking of the seed in one molar solution of (1) Ammonium Sulphate, (2) Ammonium phosphate, (3) Monopotassium phosphate, and (4) in pure water for 24 hours before sowing and also (5) control (unsoaked seed). The varieties of cotton used were Bhoj and Indore 1. Due to the effect of different nutrients on the viability of the seed, the seed rate was adjusted to the germination percentage of the soaked seed in different solutions. The treatments were repeated four times.

The results of the experiment are given below:—

Yield of kapas in lbs. per acre.

Seed soaked in				Dry seed.	Sig. Diff.
Ammonium sulphate solution	Ammonium phosphate solution	Monopotassium phosphate solution	Pure water		
350	342	314	285	> 225	49

It will be observed from the above, that the soaking of seed in the solutions of Ammonium sulphate and Ammonium phosphate increased the *kapas* yield significantly over the one obtained from seed soaked in pure water, which in its turn was again significantly higher than the one for unsoaked seed. Interaction between varieties and different soaking treatments was not significant.

(ii) **Effect of different leguminous crops on the yield of cotton grown after them:**—This investigation was also conducted at the Institute of Plant Industry, Indore. In this, Bhoj cotton was grown after various leguminous crops which were manured with superphosphate (P_2O_5 at the rate of 30 lbs. per acre) and also after juar (control). The cotton plots were further divided into two halves and one half of each plot being manured with groundnut cake at the rate of 30 lbs. nitrogen per acre, and the other half being left unmanured. The treatments were replicated four times, the individual plot size being $1/72$ nd acre.

The mean yields obtained for different treatments in the experiment were as follows:—

	After							Sig. Diff.
	Soyabean.	Ground-nut.	Cowpea.	Sann.	Jowar.	Tuer.	Gram.	
Yield of kapas lbs. per acre ..	295	288	287	278	261	255	>204	48

It will be seen from the above results that cotton when grown after gram gives significantly lower yield of *kapas* than the one obtained when it is grown either after soyabean, groundnut, cowpea sann, tuer or juar (control). It may be further seen that the differences in yields of *kapas* obtained for the crop when grown either after groundnut, cowpea, sann or juar (control) were insignificant.

(iii) **Scheme for investigation of stability of nitrogenous fertilizers in Indian soils with special reference to their availability for cotton:**—The work of the scheme was conducted at the Indian Institute of Science, Bangalore. Its objective has been to determine the extent of the loss by volatilisation of gaseous ammonia resulting from the decomposition of nitrogenous fertilizers in soils in which cotton is grown in India and also for devising methods for prevention or minimising the same under field conditions.

The experiments carried out indicated that heavy loss of nitrogen in the form of ammonia occurred when ammonium sulphate was added to typical cotton soils. It appears that the alkalinity of these soils, their high lime status and low C/N ratio were largely responsible for this position. It is further found that moisture, temperature, amount of fertiliser added, etc., increased or decreased this loss without fundamentally influencing the soil. The results showed that where the lime content of the soil was not high the loss could be minimised by adding acidifying salts like $KHSO_4$. The addition of organic matter like straw and molasses at different levels also, minimised the losses in the laboratory. These substances appeared to reduce ammonia loss either by forming

acid substances in soil, increasing carbon/nitrogen ratio or by absorption of the ammonia evolved. The exact mechanism of their action however has still to be investigated.

4. STATISTICS.

The work on statistics is being done at the Institute of Plant Industry, the details of which are as follows:—

(i) **Field Technique:**—During the course of the analysis of uniformity trial data various factors were observed to have an influence on the degree of efficiency of the incomplete block designs and one of them, *viz.*, the difference in the magnitudes of intra-class correlations within the incomplete and complete blocks was referred to in the report for 1947-48. In order to obtain a critical explanation of the observed variation in the efficiency of incomplete block designs, an examination was made of the relationship of this efficiency with six different factors, *viz.*, (1) difference, between intra-class correlation co-efficients for incomplete blocks (r_i) and for complete blocks (r_c), (2) efficiency of small blocks, (3) plot size, (4) replicate size, (5) ratio of replicate and incomplete block size and (6) standard deviation per plot in the experiment. Simple correlation co-efficients were calculated between efficiency and each of the six factors for three types of incomplete block designs, *viz.*, double, triple and balance lattices.

It was noted from the same that the first factor, *viz.*, difference between the intra-class correlation co-efficients for incomplete and complete blocks, had the greatest influence on efficiency and accounted for 70 to 75 per cent of the variation in the latter. The factor, efficiency of small blocks, was second in order of importance, while the remaining factors had a relatively small effect on the efficiency of incomplete block designs.

The combined effect of the six factors on efficiency was studied by multiple regression analysis. The multiple correlation co-efficient between efficiency and the six factors taken together came to 0.95 for double lattice, 0.97 for triple lattice and 0.99 for the balance lattice. This means that the six factors considered above provided among themselves almost a complete explanation for the variation in the efficiency of different incomplete block designs.

(ii) **Statistical study of genetics of quantitative characters.**—**Genetic variability and response to selection:**—An experiment is in progress in which selection for high and low halo-length has been continued from F_1 onwards in each of six *arboreum* crosses. The experiment was in F_1 stage during the season under report and an examination of the mean halo-length for the high and low lines in each-cross showed clearly that improvement in the mean halo-length of the high line is still progressing steadily in all crosses although with a slightly diminished rate after F_1 . The low lines have, however, reached the minimum as early as F_1 or F_2 .

and since then have been showing a slight tendency for change in their halo-length in an opposite direction.

This point is being examined further.

Examination of ginning percentages and yield of F₁ progenies selected for high and low halo-lengths in each cross confirmed the results presented last year for F₁ progenies, namely that progenies selected for high halo-length had a significantly lower ginning percentage than those selected for low halo-length in all crosses and a significantly higher yield than the latter in most of the crosses.

Breeding of Improved Varieties COTTON RESEARCH IN STATES. BOMBAY.

(1) Broach cotton breeding scheme:—The Cotton Breeding Scheme at Broach has been in operation since April 1932. The present objective of this scheme is to obtain by selection or hybridisation a suitable type of cotton which could yield, gin and spin and also resist wilt (*fusarium*) better than Vijay.

During the year under review, district varietal trials for testing new types, viz., 66-60, 98-24 and 98-41 from Broach, 3652 (Shera), 2334 (Surat) against B.C. 1-2 were conducted at four centres, namely, Broach Farm, Dabhoi Farm, Dudhathal (Kaira) and Maghnad (Broach). Type 98-41 seemed to be promising from the point of view of combination of economic characters.

Out of one hundred progenies of crosses and back-crosses of 1027 A.L.F. with B.C. 1-2 and B.C. 1-6 tried in duplicate plots, thirteen were found promising in respect of plant growth, yield of *kapas* and ginning percentage.

Vijay cotton (B.C. 1-2) multiplied on an area of three acres gave an average yield of 1045 lbs. *kapas* per acre. 600 lbs. of selfed seed was produced which was supplied to the Vijay Seed Distribution Scheme in Middle Gujarat.

The incidence of wilt in the susceptible type, 1027 A.L.F. was 55%. As against this, the progenies tried in the compact family blocks from ten families showed practically no mortality, while partial wilting and the root discoloration ranged from 0.7 to 6.8%.

(ii) Scheme for cotton breeding in Khandesh:—This scheme was sanctioned in November, 1947, and its work was commenced on the 1st April, 1948. Its object has been to test extensively the strain 197-3, evolved from a cross between Jarila and *neglectum roseum*. The new strain is not only superior to Jarila in yield by about 15% and in ginning outturn by 4%, but it has also a slightly longer staple. The further im-

provement of staple of 197-3 by crossing it with fine long staple varieties is another aim.

During the year under report, Jarila and 197-3 were tried on varying types of soil at eleven different places. The heavy rains in the last week of September affected Jarila more adversely than 197-3, with the result that the average yield of seed cotton of 197-3 was 11 percent higher than it.

It was further observed that whereas 197-3 gave a better performance than Jarila on rich and medium soils, the two varieties were practically equal on light soil. 197-3 also had a 3 per cent higher ginning out-turn and a staple length of 0.85" as compared to 0.83" of Jarila. Its fibre, however, is slightly coarser. Lint samples of the two varieties from three centres were sent to three different mills for testing. 197-3 gave a slightly lower spinning performance than Jarila, but in price valuation it was placed slightly higher than the latter.

Thirty-six cultures of 197-3, selected with the object of further improving the length and fineness of its staple, were tested for fibre properties. Out of these, 8 gave a better staple length than 197-3, and one of them had a fibre weight as low as Jarila.

About 185 lbs. of selfed seed of 197-3 was produced to serve as nucleus. Furthermore, 553 maunds of pure seed was procured from private farmers for further multiplication. The seed cotton of 197-3 fetched on an average a premium of Rs. 2/6/- per maund over Jarila.

(iii) Scheme for breeding wilt-resistant cottons in Surat area:—This scheme was sanctioned by the Committee in August, 1936, and brought into operation in April, 1937. The object of the scheme is to obtain a strain of cotton completely resistant to wilt and suited to the soil and climatic conditions obtaining in the Surat tract. This is sought to be achieved either by selection in 1027 A.L.F. or by crossing 1027 A.L.F. with B.D. 8 or other wilt-resistant strains.

The two wilt-resistant strains, *viz.*, 2266 and 3652, bred at Shera, were under further study in highly wilt infected soil at Shera and in pot-culture tests under optimum conditions of infection at Poona. Three promising progenies from each of these two strains were selected for further trials.

The wilt resistant strains 2266, 3652, 2087 and 2334 were tested in replicated trials against another promising type 77-2 and Suyog.

Type 2087 gave the highest yield. Its ginning percentage and staple length were also satisfactory. However, its superior performance needs to be confirmed by further trials.

(iv) Scheme for improvement of Wagad cotton at Viramgam, Jagudan and Bavla.—The Committee decided in August, 1935, that a comparative study of Indian and Iranian *herbaceum* cottons should be under-

taken, with the object of developing suitable superior *herbaceum* types for cultivation in the large short staple, Dholleras tract. A special Officer was deputed to Iran to collect *herbaceum* types of cotton grown in that country and, in August, 1936, a five-year scheme was sanctioned for the improvement of Wagad and Mathio cottons, the work on Wagad cotton being located at Viramgam and that on Mathio, at Amreli. This improvement was sought to be achieved by (a) selection in Wagad cotton (b) hybridisation with Surti-Broach quality cottons like 1027 A.L.F. and B.D. 8 and (c) hybridisation with early maturing and better quality Iranian *herbaceums*. The work of the scheme is now conducted at Viramgam, Jagudan and Bavla.

The results of the trials conducted during the year brought out once again the superiority of the strain 'Kalyan' over the local Wagad in respect of both yield and ginning outturn. Out of the breeding material on hand, 88 cultures possessing early maturity and desirable economic characters and 86 selections combining long staple with high ginning outturn have been retained for further study. Furthermore, crosses were made between Kalyan, Vijay and some other long staple varieties, with the object of improving the staple of Kalyan.

(v) Scheme for improvement of Dharwar-American cotton:—This scheme was sanctioned by the Committee in July 1941 with a view to improve the Dharwar-American cotton crop grown in the Kannada districts of Bombay, and the adjoining areas of the States of Madras, Hyderabad and Mysore. The production of an early maturing type which is superior to Gadag 1 in respect of yield, staple length and ginning percentage, and is at the same time more resistant to 'red-leaf' blight is the primary objective. This improvement is sought to be achieved by either selection in the existing material or by hybridisation. The work is being done at Gadag, where conditions of soil, climate, rainfall, etc., are suited to the cultivation of *Hirsutum* cottons.

The experiments conducted during the past eight years to test Seg. 9-3 subsequently renamed (Laxmi) against Gadag-1 showed that the former was superior to the latter by 15% in yield of *kapas*, and by 3-3% in ginning outturn. The staple length of Laxmi is 0.94" against 0.83" of Gadag-1 and the new variety has been adjudged suitable for 42's standard warp counts as compared with 33's of Gadag-1. It is reported that the spinning tests conducted in the mills on 1948-49 produce showed the superior performance of Laxmi even under mill conditions. During the year under review, Laxmi was further crossed with promising inter-specific material from Surat with a view to improve its fibre properties. In the hybrid material under study it was observed that none of the progenies from the backcross material of (Co. 2 x *tomentosum*) x Co.2 suffered from jassids. On the other hand, none of the cultures derived from crosses effected between Gadag-1 and other superior American

varieties both Indian as well as East African, was found superior to Laxmi.

In the varietal trial with Laxmi groundnut cake at 8 lbs. N per acre applied a fortnight before sowing, is said to have given the best results.

(vi) Scheme for improvement of Mathio cotton at Amreli:—This scheme has for its object the improvement of Mathio mixture in respect of yield, ginning percentage and quality of staple. It also aimed to conduct trials at Amreli of the early strains of Wagad evolved at Viramgam with a view to replacing if possible the inferior Mathio cotton by early *herbaceums*. The scheme came into operation in June 1937.

During the year under report, a large scale varietal trial to compare Pratap with Mathio Local was conducted at Amreli farm. There was no significant difference in yield between the two cottons. However, Pratap was again found superior in ginning outturn and fibre characters.

Besides the district trials with Pratap, ninety-eight single plant selections and twelve progenies obtained from the crosses of Pratap with C. 520, the long staple *arboreum* of southern India, were tested against Pratap and local Mathio. Sixteen promising progenies were selected for further study.

Out of a population of 4,000 plants of the back-cross, (Pratap x Coimbatore long staple *arboreums*) 64 plants were selected for desirable combination of ginning percentage and staple length.

PUNJAB.

(i) Scheme for improvement of cotton of south-eastern districts of the Punjab:—This scheme is an off-shoot of the Punjab Botanical Scheme. It was sanctioned by the Committee in July 1944, for a period of five years, and the work commenced at Hansi on the 1st March, 1945.

The object of the scheme is to replace the area under *desi* cotton by high quality American cottons in the irrigated portions of the tract without, however, losing sight of the desirability of breeding improved *desi* types which would continue to be grown in certain parts of the districts in question.

The work carried out in the past on *desi* and American cottons had yielded two improved strains (one of each type) which, in the extensive trials carried out, proved superior to the existing local varieties. The improved *desi* strain, 231R, gave an average yield of 13.34 maunds of *kapas* and a ginning outturn of 42% against 11.71 maunds per acre and 38.3% ginning, respectively, of the standard Mollisoni strain, M.60A.2. Further attempts to improve the staple of *desi* resulted in the evolution of 3 hybrid strains, *viz.*, DC1, DC2 and DC3, capable of spinning up to 14's against 6's of local *desi*. The results, however, need to be confirmed by field testing. The new American strain "Hariana", which was approved for distribution, was found to give a mean yield of 13.76 maunds *kapas*

per acre against 11.68 maunds of the *desi* variety, M.60A2. It has a staple of 0.92" and a ginning percentage of 32.8 and is capable of spinning 33's standard warp counts against 6's of Mollisoni. The growers of "Hariana" realised a price of Rs. 29/8/- a maund of *kapas* against Rs. 28/2/6 per maund of *desi*.

During the year under review, 2,000 maunds of seed of "Hariana" were purchased for cultivation on 10,000 acres in a compact block of 28 villages. Two more American strains, AC. 101 and AC. 102, are reported to be more promising than "Hariana," their average yield being 10.1 and 10.8 maunds of *kapas* per acre against 9 maunds of "Hariana". Their ginning percentage is 34.2 and 34.7, respectively against 32.7 of "Hariana." AC. 102 is said to be superior in spinning performance also.

Two more hybrid strains appear to be promising, particularly with regard to ginning percentage which is 37.0 against 33.0 of "Hariana". Some noteworthy re-selections in "Hariana", viz., 216F/3, 216F/14 and 216F/48, were found to be superior to the parent strain in respect of yield, ginning outturn and lint length. Selection in Perso-American has resulted in the isolation of a strain known as 23F superior to 216F in all respects. It is expected that as a result of the work done under the scheme, the *desi* cotton grown under irrigation will be replaced by the American variety before long.

(ii) Scheme for breeding of American cotton suitable for submontane districts of East Punjab:—This scheme was sanctioned by the Committee in November 1947 and commenced working in October 1948. Its object is to evolve American types of cotton capable of replacing the short stapled *desi* at present grown over an area of about 72,000 acres in the sub-montane tract of the East Punjab, comprising the districts of Jullundur, Ludhiana, Gurdaspur and Hoshiarpur.

During the year under review, ten promising American strains were tested against the local *desi* in two large scale yield trials. The results revealed that on the basis of acre cash value, J.2, 347F and 359F were the most promising. In another small scale trial yet another American strain, J.17, proved to be superior to the standard strain 216F.

The agronomic experiments involving date of sowing and optimum dose of manure are reported to have shown that the best time for sowing in the tract is the month of April and the most economical dose of nitrogen is 50 lbs. per acre. It was also found that ammonium phosphate was better than either ammonium sulphate or groundnut cake.

Another trial of considerable economic interest is that relating to the possibility of raising *rabi* crops after the harvest of cotton. The experiment is reported to have shown that if the field is manured by the application of ammonium sulphate after the removal of the cotton crop,

a good crop of wheat can be raised in the same field. The yields of cotton and wheat, in the double crop experiment in the year under review, were 22.15 maunds and 22.18 maunds, respectively.

(iii) Scheme for breeding long staple cotton in Punjab:—This scheme was sanctioned by the Committee in November, 1947, and it started working from the 1st April, 1949. The object is to evolve American varieties of cotton with a staple length of 1" and above.

The problem of evolving long linted varieties is being tackled by making crosses between the local acclimatised American varieties as well as between the local and the exotic varieties. Out of 125 hybrid families tested, 85 were found to possess a mean staple length of more than 1". Of these, 18 families derived from (199F x Wilds strain) had a ginning outturn of 34% and above. Amongst the hybrid strains tested against L.S.S. at Abohar, several appeared to combine the desired economic characters. Strains L.L.25 and L.L.29 are stated to be worthy of special venture.

MADRAS.

(i) Scheme for improvement of Mungari cotton in Madras State:—On the black soils of Anantapur, Bellary and Kurnool districts of the Madras State, cottons commercially known as Westerns and Northerns are grown. These are medium staple varieties, capable of spinning 24s 32s counts. The type of cotton grown on the red and mixed soils, on the other hand, is that known by the name of Mungari, which is of course, a short staple variety, similar to Bengals, and not fit to spin more than 8s or 10s. The co-existence of varieties of widely different value favours undesirable mixing with the result that the better cottons suffer in price. It is to overcome this difficulty that the Mungari scheme was sanctioned by the Committee in 1937. The object of the scheme is to evolve a strain suitable for cultivation on the red soils and which would combine the quality of the westerns with the yield of Mungari.

Among the large number of new hybrid progenies undergoing comparative tests, two out-yielded controls, and eleven excelled the staple length of the improved strain 881.F, produced under the scheme previously. The Hyderabad variety, G.4 M.11, continued to be stenosis-resistant. The multiplication of 881.F on a large scale was arranged to meet the huge demand for seed from the cultivators of Bellary, Anantapur and Kurnool districts.

(ii) Scheme for improvement of Cocanadas cotton in Madras State:—This scheme was sanctioned by the Committee in November, 1938, and the work was started from 1st February, 1940. The object of the scheme is to improve the yield and ginning percentage of Cocanadas cotton, preserving at the same time the light pinkish colour of its lint due to which it is in great demand for the manufacture of dyed yarns.

During the year under review, the strains, 336B and R.H.25 maintained their superiority over C.1 and 'Palnad' bulk in most of the characters. The early *arboreum* strains like 197-3 and 607-4 were found to be unsuitable for late sowings. 881F gave as much yield as the local *Cocoonada* in the late sowings at Gurzala. The qualities built up in 336B or 2545-8 are expected to satisfy the objectives of the scheme, in so far as seed cotton yield, lint colour, ginning outturn and spinning values are concerned. 881F and 197-3 maintained their past performance as regards their suitability for the Chinnapathi area.

(iii) Scheme for breeding Combodia cotton in ceded districts in Madras State:—This scheme was sanctioned in July 1944 and put into operation with effect from 1st April, 1945. The objects of the scheme are (1) to evolve a long staple American variety capable of giving good yields when grown as an irrigated *rabi* crop, and (2) to breed an exotic type suitable for cultivation in the unirrigated regions not served by the Tungabhadra project.

The work is conducted at three centres—Siruguppa, Hagari and Nandyal, representing three distinct districts, *viz.*, (i) irrigated black soil. (ii) unirrigated black soil, subject to variable rainfall and (iii) unirrigated black soil, characterised by a relatively heavy rainfall and early season.

In the bulk trials conducted at Siruguppa, during the year under report, MA2 once again proved to be the most consistent in yield, earliness and jassid resistance but suffered from defective boll opening, low maturity of fibres and susceptibility to blackarm.

The Surat backcross reselections, *viz.*, 2196-4 and 1821-1-1 were found to be resistant to blackarm and jassids, respectively, during this year also. Amongst the re-selections, 2730 derived from Parbhani American, was found to be superior to HA 11 in yield and staple length though lower in ginning outturn. Another reselection, 2164-5 from HA 11, was also found good in many respects.

In the family block trials and progeny rows, selections from MA 11 HA 11 and Surat crosses, showed improvements in yield, ginning per cent and lint length. Amongst the crosses, combinations involving MA 11 or HA 11 were found to be useful in improving the yield. But for lint length, Coimbatore types, Parbhani American and MA VIII were found to be desirable.

In the unirrigated trials at Hagari and Nandyal, four types, *viz.*, 6094. C. XVI, B.C. 68, D.A. 2-6-5/3 and MA II gave yields of *kapas* equal to N. 14 at Nandyal, while MA II alone was found to be equal to H1 at Hagari. In the family block trial at Nandyal, 1633-4/7 was found to be promising and was pure for all the characters studied. At Hagari, three other families were found promising.

(iv) Scheme for production of long staple cotton in Madras State:—

This scheme was sanctioned in July 1945 and it came into operation in November 1946. The objects of the scheme are (a) the isolation of Upland strains having a staple longer than 1.1/16" and capable of maturing in 5.1/2 months and (b) the evolution of *barbadense* varieties suitable for cultivation in the coastal parts of South Arcot district. During the year under review, the performance of the strain 7682 was very promising. The results confirmed its superiority over the local Cambodia, both in respect of yield and lint length. The lint of this strain had been adjudged suitable for spinning up to 52's S.W.C. Amongst the hybrid cultures under study, four were found higher ginning and longer in staple than Co.4/B.40. These, however, require further testing. Fresh crosses were made between Mesilla Acala and Sealand 542, and the other promising, long linted strains under study.

(v) Scheme for improvement of Westerns cotton in Madras State:—

This scheme was sanctioned in March 1948 and commenced working in June 1949. The object of the scheme is to evolve a strain of medium staple (13/16" and over) Westerns cotton to replace the existing variety H. I. The new strain should possess a ginning outturn of not less than 33%, early maturity and resistance to wilt and record less wastage in processing.

During the year under report two selections, *viz.*, Nos. 4136 and 3791-5-6 were found superior to H. I. in the bulk tests of improved families. The performance of two more selections, *viz.*, 2-3-68 and 2-3-69 was also satisfactory particularly in respect of staple length. Another strain, No. 2711-2-2-1, has been adjudged suitable for spinning 30's warp against 27's of H. I. (Westerns-I). New crosses were made using selected improved varieties as parents.

(vi) Scheme for improvement of white Notherns cotton in Madras State:—

This scheme was sanctioned by the Committee in March 1948 and it came into operation in June 1949. The object of the scheme is to evolve a type combining the length and fineness of N. 14 staple with a ginning percentage of about 33 and suitability to different types of soil and climate of the tract.

During the year under report, 4 selections, one derived from a hybrid between 1523 and G.4 and three from a cross between 1523 and N.14, were compared against local on cultivators' holdings. One of them, *viz.*, 5202 was found to combine good lint yield and quality. It is proposed to conduct further extensive trials with this variety. Forty three families were tested against N.14 and Gadag. Amongst these, six families, 5935, 6234, 5888, 6313-10, 6218-2 and 6224 3/1A were found superior to both N.14 and Gadag. The study of selections in progeny rows showed that only two progenies out of 174 were better

than the control variety, N.14, in both yield and ginning outturn. 480 single plants were selected from the progeny of eighteen crosses and among these the hybrids derived from Cocanada as one of the parents, proved to be vigorous, and high yielding.

(vii) Scheme for breeding long staple American cotton as a winter crop in central districts and Sea Island varieties in the West coast of Madras State:—This scheme was sanctioned by the Committee in March, 1948, and it came into operation in April, 1949. The objects of the scheme are (1) to produce superior *hirsutum* types suited to central districts and possessing a staple length of 1.1/16" to 1.1/8" and (2) to evolve a Sea Island type for growing in the West Coast districts.

During the year under report, a set of 27 promising *hirsutum* cultures was tested against the three varieties, Co2, 4463 and Uganda 1. Five selections were found to give yield equal to Co2, the best control. They were also cosmopolitan in habit. Two of the five promising selections were superior to Cambodia 2 by 5 mms. in staple length and 2 per cent in ginning outturn.

Varieties of *G. barbadense* collected from West Indies, Egypt and Madras were tried in coconut gardens as well as on ordinary land in the West Coast of Madras State. All varieties suffered from blackarm but the virulence of attack was more severe in imported types than in the acclimatised varieties and the damage was heavier in the open than under the shade of coconut trees. Control of blackarm is considered as a major problem in the development of Sea Island cotton as a rain-grown crop on the West Coast.

The yield of Sea Island Cotton as an intercrop in coconut gardens ranged from 126 lbs. to 360 lbs., of *kapas* per acre. It was also observed that in comparison with the crop grown, on ordinary land, that grown in coconut gardens possessed longer staple and higher fibre maturity.

The plants sown in 1947 and allowed to grow as perennials showed a progressive increase in yield, when adequately manured and when the plants were not cut back. The staple length remained at or about 1-13/16" in first year as well as succeeding seasons. Local mills adjudged it to be suitable for spinning 100's warp counts, but the sample was considered rather variable and neppy.

The south American perennials, *viz.*, Moco and Quebradinho, gave good yields on *modan* fallows, and the former was found fit for spinning 50's warp counts. Both these varieties appeared to suffer much less than Sea Island cotton from pests, diseases and drought.

(viii) Scheme for improvement of Tinnevelly and Karunganni cottons in Madras State:—This scheme was sanctioned by the Committee in March, 1948, and was brought into operation in June 1949. The

object of the scheme is to produce by hybridisation a strain possessing a staple length exceeding 15/16" and suitable for cultivation in the cotton areas of the central and southern districts.

At present, the Karunganni strains, K.2 and K.5 are under cultivation in the southern and the central districts, respectively. K.2 needs to be improved for fineness of fibre and K.5 in ginning outturn. Above all, the new strain should be suitable for the entire Karunganni area.

In the year under review, two selections—namely 6435-2 and 6874—gave an average yield of 600 lbs. of seed cotton per acre, a ginning outturn of 34 to 36 per cent, and a staple length of nearly an inch.

MADHYA PRADESH.

(i) **Scheme for improvement of cotton in Nagpur-Wardha tract of Madhya Pradesh:**—This scheme was sanctioned by the Committee in November, 1947, and was put into operation on the 1st April, 1948. The objects of the scheme are (i) to evolve by selection and hybridisation somewhat late ripening strains of *desi* cotton, with ginning percentage of 33 to 34 and capable of spinning 20-25's standard warp counts and (ii) to isolate by selection improved strains of American cotton with ginning percentage of about 32 and spinning capacity of 35's to 40's standard warp counts.

During the year under report, three varietal trials, two with *desi* cotton varieties and one with American strain, were carried out in randomised blocks. In the first trial, strain No.91 gave the highest yield, viz., 1,478 lbs. of seed cotton per acre. In the second trial, strain No.5 is said to have stood first with an yield of 380 lbs. of *kapas* per acre. In the third test, 3 strains of American cotton were compared with local Buri. 0396 gave the highest yield of 1103 lbs. per acre, and was adjudged suitable for spinning 44's standard warp counts.

District trials were conducted on cultivators' fields in 9 localities with *desi* varieties and at 5 centres with American strains. The results showed that H.420 and No.91 gave the highest yield amongst *desi* types. In the experiments with American varieties, strain 0396 stood first followed by 0394 and 0382. The results of trials during the past two years also showed that Buri No.0396 was more suited for the Nagpur-Wardha tract.

(ii) **Scheme for improvement of cotton in Akola-Amraoti districts:**—This scheme was sanctioned in November, 1947, and put into operation on the 1st April, 1948. The objects of the scheme are (i) to evolve somewhat late ripening strains of *desi* cotton, having strong stemmed plants and possessing a staple length of 3/4 to 13/16 inch and ginning percentage of 34 to 35 and (ii) to isolate improved strains of American cotton with a staple length of about 7/8" and ginning percentage of 33.

During the year under report, varietal trials one with *desi*, and the other with American cotton strains were carried out in randomised replicated plots. In the first trial, strain No. 091, gave the highest yield of 417 lbs. of seed cotton per acre. In the second trial, strain No. 0394 gave a significantly higher yield of 648 lbs. per acre than the controls, Buri 107 and local Buri. It also recorded a ginning percentage of 35, as against 29 of Buri 107.

Districts varietal trials were carried out with *desi* and American varieties. In the *desi* trials, H.420 gave the highest yield followed by strain No.91. In the trials with Buri American strains, the performance of 0394 was most promising.

(iii) Scheme for improvement of cotton in Buldana tract:—This scheme was sanctioned by the Committee in November, 1947, and it came into operation on 1st April 1948. The object of the scheme is to isolate improved strains of Jarila cotton possessing strong stems and good opening of bolls.

One varietal yield trial was carried out in randomised replicated plots with four new strains, *viz.*, M.5A, 91, 197-3 and 907 and Jarila. M.5A stood first in yield but the differences between it and the other varieties were not significant. M.5A is said to possess a staple length of 22 mms. and the capacity to spin up to 39's standard warp counts.

Five district yield trials were also carried out in cultivators' fields with three improved strains, Jarila and the Khadesh variety, 197-3. Of these, M.5A stood first in yield followed by No.91. Strain M.5A was also found to give the highest cash value per acre.

(iv) Scheme for improvement of cotton in Ghat tract:—This scheme was sanctioned by the Committee in November, 1947, and was put into operation on the 1st April, 1948. The object of the scheme is to make selections in Verum 434 and other *desi* cottons grown in the tract with a view to isolating longer stapled (13/16" to 14/16") and better ginning (33% to 35%) strains.

In the preliminary varietal test carried out during the year under report, 9 strains were tested against H.420. Two strains No.1 and No.8 gave the best yields.

Seven district varietal trials with M.5A, No.111, No.17, N.91, H.420 and local Jadi were also carried out in representative localities. All the new strains were found equal in yield to local Jadi at Nandura and significantly superior to it at the Government Farm, Basim.

UTTAR PRADESH.

Scheme for hybridisation in arboreum cottons in Uttar Pradesh:—This scheme was sanctioned by the Committee in July, 1943, and it came into operation on the 1st April, 1944 and terminated on the 31st March, 1950. The object of the scheme was to evolve strains of *desi*

cotton, (primarily for the rainfed areas of the State), which, while possessing the earliness, hardiness, yield and ginning qualities of the variety, C.520, would be capable of spinning higher counts than the latter. This was proposed to be achieved by crossing some of the promising strains produced under the Uttar Pradesh Botanical Scheme with superior quality cottons, such as Jarila, Verum, Bani, Gaorani, Shans and Million Dollar.

New promising selections combining the desirable characters had been obtained from crosses made prior to the starting of this scheme between the different *desi* varieties, *viz.*, C.520, C.402, Million Dollar, Shan, Bani, etc. The only derivatives which maintained some superiority over the control (C.520) were those obtained from C.520 and C.420. Amongst the crosses made during the period of the scheme—1944-45 to 1948-49—one of the segregates from 35/4 x Parb. G.703, is stated to have given better yield than C.520 but it was, however, only equal to it in respect of lint length and ginning outturn.

Among American types, one F-10 segregate from Iran, 1/9 X Perso American, was found to be superior in yield, lint length and ginning outturn to the control variety Perso-American.

ASSAM.

Scheme for improvement of hill cotton in Assam:—This scheme was sanctioned in January 1944 for a period of five years and it came into operation in February 1947. The object of the scheme is two fold (1) production of a high yielding type of short staple cotton with high ginning percentage, and (2) introduction of improved methods of cultivation.

During the year under review, altogether 166 types collected from the various hills of Assam and outside were studied. Two types, *viz.*, Mikir 159 and 168 were retained for further study. Among the long and medium staple types, only 4F and L.S.S. were reported to be successful. Egyptian types proved a failure owing to their inability to stand the weather conditions, and the *herbaceums*, though good in respect of growth, flowered very late and did not set any bolls. Plants with broad leaves were found to be susceptible to Leaf Roller. It was also observed that owing to their combining high ginning percentage with good yield, the Garrow Hill types formed the best material for selection work.

HYDERABAD STATE.

Scheme for improvement of cotton in Parbhani district:—This Scheme was sanctioned by the Committee in February, 1947, and it started functioning from the 1st April, 1947.

The objects of the scheme are :—

- (1) the production of a high ginning and highly wilt-resistant strain of G.12F-2 for the entire district of Parbhani, if possible.
- (2) the production of similar strains from basic material other than G.12F-2.
- (3) the maintenance of the improved strains of American cotton bred for the *ghat* area of Aurangabad district.
- (4) the study of wilt-reistance in field conditions at Parbhani and under optimum conditions of temperature and infection at Poona, and
- (5) the carrying out of district trials of the improved strains against the local variety.

During the year under review, the efforts to evolve a higher ginning and wilt-resistant strain of Gaorani 12 resulted in the production of ten strains. Of these, four strains, namely, II-43-35, II-44-1231, II-44-1290 and II-44-1244 were under trial in the cultivators' fields. Five strains obtained from the basic material other than Gaorani 12 proved to be higher ginning than Gaorani 12 and fairly resistant to wilt. All these were found suitable for cultivation in the southern parts of Aurangabad and Bhir districts.

In addition to the above, twenty-five strains from Gaorani 12 and other *desi* material were found to possess a ginning percentage of 37 to 38. It is proposed to test them further.

Twenty cultures from 6838-2-6-10 (Gaorani 16 C) and one from 6107-II-4-5-6-7 (Gaorani 4 M-11) were found to be homozygous for 100 per cent wilt resistance. Four cultures from the former progeny possessed fairly fine fibre and high ginning percentage.

MYSORE STATE.

Scheme for breeding Sea Island and Egyptian cottons in Mysore:—

This scheme, which is an offshoot of the Mysore (Doddahathi) Cotton scheme, was sanctioned by the Committee in January, 1944, and put into operation on the 1st November, 1944.

The objects of the scheme are :—(1) the acclimatisation and breeding of Egyptian and Sea Island cotton, and (2) the testing, in large scale trials, of Mysore-American strains evolved under the Doddahathi scheme.

A varietal trial of all the Mysore-American types with Co.4 as control was conducted in March 1949. M.A.5 gave the highest yield.

The date of sowing experiment with M.A.XI, M.A.X, M.A.V, M.AIV, M.A.IX and Co.4 was repeated and the sowing was done in December, 1948, May 1949 and June 1949. M.A.V gave uniformly higher yield in all the sowings while M.A.X, gave the next best yield in the May sowings. The two new strains, M.A.XI and M.A.X, were early by a fortnight while M.A.IX was late by 2-3 weeks as compared with Co.4 and M.A.V.

In the new hybrid material (M.A.V x Tide Water and Express) under study, thirty-five progenies with the same productivity as the material parent, a staple length ranging between 30 and 33 m.m. and a ginning percentage of 32-36 have been selected for further study under rainfed as well as irrigated conditions.

The sowings of Egyptian Cotton at Visveswariah Canal Farm were conducted during October, November and December 1948 and 1949, respectively. The 1948 sowings gave fairly good yields. M.A.V used as control gave the highest yield, followed by Giza 12, Maarad, Giza 7 and Sakel among the Egyptians. On account of shortage of water for irrigation, the experiments conducted in 1949 were vitiated and very poor yields were obtained.

On the Babbur Farm in 1949 season, the highest yield was obtained for Giza 7 in May sowings, for Sakel and Maarad in July sowings and for Giza 12 in June sowings. M.A.V used as control had given higher yields than the Egyptians in all the sowings. A 'spacing' trial conducted with Giza 7 and Giza 12 confirmed that a spacing of $2\frac{1}{2}'$ between rows and 9" between plants was the optimum spacing.

For the first time Giza 12 and Giza 7 were tested under rainfed conditions in two typical areas of semi-malnad tract of the State and the acre yields were as high as 1,000 lbs. for Giza 12 and 936 lbs. for Giza 7. The varieties seemed to fare well on blackish types of soils than on pure red sandy loam.

The trials conducted with Sea Island V.135 confirmed the previous observation that the October sowings yielded better than sowings done in other months.

RAJASTHAN.

Scheme for improvement of cotton in Mewar:—This scheme was sanctioned in February 1947 and it came into operation on the 16th June, 1948. The object of the scheme is to evolve a strain of American cotton with a spinning quality and staple superior to Indore I.

During the year under report, four strains, viz., M48-4, M48-16, M48-42 and M48-46 were found to be promising. These are proposed to be tested in a varietal trial during the next season.

MADHYA BHARAT.

(i) **Institute of Plant Industry, Indore:—**Work for breeding superior varieties of cotton for Malwa was continued during the year under report at the Institute of Plant industry, Indore. The varietal trial included seven new Malvi strains, *viz.*, Malvi 10, 11, 12, 13, 14, 15 and 16, which were tested against Malvi 9, Jarilla and Bhoj. The trial is reported to have suffered badly from the long dry spell that followed immediately after sowing. The crop was patchy and stunted. The results showed that the yield differences were not significant. Malvi 12 was, however, again found to be equal to Malvi 9 in yield of *kapas* per acre and superior to it in ginning outturn, spinning performance and wilt resistance.

A set of 35 single plant progenies was grown in non-replicated rows in wilt sick field from the seed obtained from the wilt surviving plants of the previous year. Of these, only four progenies were found desirable for further study.

In addition to the plant breeding programme a large number of agronomic investigations were also conducted during the year at the Institute the results of which were as under:—Long term rotational and manurial trial, was repeated during the season. It consisted of in all 72 manurial treatments in each crop plot measuring 116'8" x 162' the ultimate plot size being 4'-8" (4 rows) x 22' net. There are two replications. This is the third year of the trial and in one rotation, which is three course, cotton followed wheat and jowar as the two preceding crops while in the other (four-course) rotation, wheat, jowar and groundnut were the preceding crops for cotton. Groundnut crop in this series is, as stated previously, was not manured.

In the first rotation, cotton manured directly gave a significantly higher yield than the unmanured control, while treatments in which the preceding crop of jowar or wheat or both were manured in addition to cotton, the yield of cotton was significantly higher than where cotton alone was manured. The actual yields of cotton under the different treatments are shown below.

Crops manured in the sequence, wheat 1st year, jowar second year, and cotton third year.										Yield of kapas lb. per acre.
1.	Cotton only	..	..	..	..	..	..	..	..	288
2.	Cotton, jowar	..	..	..	..	..	..	..	..	320
3.	Cotton, wheat	..	..	..	..	..	..	..	..	352
4.	Cotton, jowar and wheat	..	..	..	..	..	..	..	..	380
5.	Jowar, wheat	..	..	..	..	..	..	..	..	254
6.	Jowar	..	..	..	..	..	..	..	..	228
7.	Wheat	..	..	..	..	..	..	..	..	224
8.	No manure control	..	..	..	..	..	..	..	..	215
					Sig. diff.	..	..	..	..	40

Differences between kinds of manure, ammonium sulphate, groundnut cake and F.Y.M., were not significant. The difference according to frequency, *i.e.*, intensity of manuring shown above, were also more pronounced in the case of ammonium sulphate and groundnut cake. Interaction with phosphate was also higher for these two manures.

Yields of kapas (lbs. per acre.)

				F. Y. M.	Ammonium sulphate.	Groundnut cake	Control
N	..	..	..	271	299	294	215
NP	..	..	..	282	343	329	
Av. of N and P	..	..	..	265	269	273	

Sig. diff. for average of N and P and NP = 31 for individual manures.
Sig. diff. for response to N = 63 for individual manures.

In the second rotation, cotton followed groundnut and again gave a higher yield than in the first rotation where it followed jowar, the average yields of *kapas* being 308 and 268 lb. per acre. respectively.

While there was a significant response to all three manures, F.Y.M. gave a slightly lower yield than the other two, as in the first rotation. There was no residual effect on cotton of manures applied to wheat crop preceding groundnut and cotton. In regard to the interaction between nitrogen and phosphate, the results were similar to those obtained in the first rotation.

The first cycle of the three-course rotation was completed this year and the average results for the three years reveal that only the direct and cumulative effects of the manures were significant but not the residual effects.

Effect of manure and yield of kapas (lbs. per acre.)

Cumulative	Direct	Residual	No manure
314	297	243	24

The yields obtained from nitrogen and phosphate together were consistently higher than the average of the two applied separately, except where F.Y.M. was applied directly. The effect was most pronounced for ammonium sulphate.

A manurial trial with graded doses of nitrogen and phosphate was conducted in two fields of medium (F.11) and high (F.7 c) fertility with graded doses of 0, 20, 40, 60 and 80 lbs., N per acre in the form of

groundnut cake and ammonium sulphate together with 0 and 40 lbs. P₂O₅ per acre as Superphosphate. Each trial had three replications and the plot size was 1/115th acre. The variety of cotton grown was Malvi (Dhar 43) and sowing was done on 1st and 2nd July, 1949. Superphosphate was drilled and groundnut cake and ammonium sulphate were broadcast before sowing. The peculiarity of the season was that in medium soil, (F.11), the yield of cotton was very much higher, being 754 lbs. *kapas* per acre than in rich soil (F.7 c) where the yield was only 364 lbs. *kapas* per acre. The lower yield in rich field was due to heavy shedding caused by rain in October.

The results of the trial were as under :—

Yield of *kapas* (lbs. per acre.)

	80 lbs. N	60 lbs. N	40 lbs. N	20 lbs. N	0 lbs. N	Sig. diff.
Medium field ..	898	839	809	674	553	140
Rich field ..	409	499	420	395	368	32

		Groundnut Cake.		Ammonium Sulphate.		Sig. diff.
Rich field		468		438		22
		40 lbs. P ₂ O ₅		0 lbs. P ₂ O ₅		
Rich field		465		407		20

		0 N	20 lbs. N	40 lbs. N	60 lbs. N	80 lbs. N	
Rich field	0 P ₂ O ₅	354	386	370	477	443	46
	40 lbs. P ₂ O ₅	381	405	468	522	554	

(ii) Scheme for improvement of Nimar cotton in Madhya Bharat:—

This scheme was sanctioned by the Committee at its meeting held in February, 1947, and was put into operation in June, 1948. The object of the scheme is to evolve a strain of cotton that combines the yielding capacity of the local Nimari variety with the ginning percentage, spinning quality and wilt-resistance of Jarila. This is sought to be achieved by making (1) single plant selections in Jarila, local Nimari and other strains and (2) hybridising Nimari and Malvi strains with Jarila and Verum selections from Madhya Pradesh, and other superior quality *arboreums*.

It is reported that in the strains' tests, the performance of strains D.46-5, D.47-20 and D.47-28 was promising.

CHAPTER IV

EXTENSION WORK IN THE STATES.

The Seed Distribution and Extension Schemes of the Committee form the real link between the experimental station and the cultivator and in recent years increasing attention has been paid to the extension work with the object of getting the grower to use the various improved practices and improved seed evolved as a result of the research schemes of the Committee. The total amount so far spent by the Committee on such schemes amounts to some Rs. 26.4 lakhs. During the period under review, there were 15 seed distribution and extension schemes in operation in the various cotton growing States. A brief report on the working of these schemes is given below:—

BOMBAY.

(i) Jarila seed distribution and extension scheme:—This scheme was sanctioned in March 1937. The original object of the scheme was to replace Banilla in the Khandesh tract over an area of 1,55,000 acres with *Jarila* which is wilt-resistant. In view, however, of the general suitability of *Jarila* for the conditions obtaining in Khandesh, the target of area was raised to 5,00,000 acres. The object of the scheme during the extension period was to test 197-3, a newly developed superior strain, under different conditions of soil and climate, to arrange for the carrying out of mill spinning tests of this new variety in comparison with *Jarila*, and to multiply the pure seed of both the varieties.

Stages I and II:—The selfed seed produced in the previous year was sown on an area of 14 acres on the farm and 2,282 lbs. of seed were obtained for further multiplication. The seed of stage II produced from 132 acres amounted to 22,020 lbs. The produce was ginned under departmental supervision and it is stated to have fetched a price of Rs. 39-8-0 per Bengal maund of seed cotton *Kapas* against Rs. 38,- for ordinary *Jarila* cotton 135 lbs. of selfed seed and 924 lbs. of first generation seed of 197-3 were also produced on Jalgaon Farm.

Stages III and IV:—Of the 42,57,760 lbs. of *Jarila* seed stocked by the Agriculture Department and approved stockists, 20,58,290 lbs. were distributed for sowing.

The total area under *Jarila* (including natural spread) during the year was estimated at 2,27,185 acres against 2,47,739 acres in the previous year. This reduction in acreage was attributed to the prejudice against *Jarila* and also to the preference shown by the cultivators for the more remunerative crop of groundnut. Of this total area under *Jarila*, the controlled area was 92,458 acres, including a reserved area of 32,616 acres.

The growers realised the average price of Rs. 37-11-0 per Bengal maund of seed cotton against Rs. 31-3-0 obtained in the previous year. The arrangements made by the co-operative societies to hold auctions were not successful this year owing to the fixation of floor and ceiling prices by the Government.

For sowing in 1950-51, 20,33,260 lbs. of Jarila seed was stocked by the Agriculture Department and approved stockists. This was sufficient to cover an area of 80,000 acres. In addition, 47,884 lbs. of 197-3 cotton seed had also been stocked.

The Government of Bombay removed the restrictions under the Cotton Control Act on the compulsory cultivation of Jarila in the Khan-desh protected area.

(ii) Revised Jayawant & Gadag No. 1 seed distribution scheme:—

This scheme was sanctioned in August 1935. The object of the scheme was to replace local mixtures of seed by pure Jayawant and Gadag No. 1 in the Southern Division of the Bombay State over an area of 9½ lakhs acres, which was subsequently raised to 14½ lakhs acres.

The scheme was operated from eleven centres for Jayawant, *viz.*, Dharwar, Hubli, Nargund, Haveri, Bailhongal, Gokak, Athani, Bagalkot, Hungund, Bijapur and Muddebihal and from two centres for Gadag No. 1, *viz.*, Gadag and Ron. Decentralisation was the key-note of the scheme, the idea being that the agency at no single centre should have too big an area to cover or too great a responsibility to shoulder.

During the year under report the Department organised the sowing and roguing of 74,959 acres of Jayawant, 13,121 acres of Gadag No. 1, 7,447 acres of Jayadhar and 5,624 acres of Laxmi.

Owing to the effects of the "Grow More Food Campaign", unfavourable rains, and attractive prices for food grains, all the cotton seed stocked by the Department could not be distributed. The quantity of seed actually distributed and the area, covered are shown in the following table:—

Variety.					Quantity of seed distributed.	Area covered		
						With Departmental seed.	With natural spread seed	Total
					Lbs.	Acres.	Acres.	Acres.
Jayawant	..	..	..	..	38,98,020	3,37,178	1,68,149	5,05,322
Gadag No. 1	..	..	..	..	9,19,300	93,647	58,890	1,52,087
Jayadhar	..	..	..	..	1,24,320	11,222	6,000	17,222
Laxmi	..	..	..	..	66,800	6,756	...	6,756
Total					50,08,440	4,48,798	2,32,589	6,81,387

The graded produce of both the reserved and general areas amounting to 18,785 *docras* (1 *docra*=300/400 lbs.) of Jayawant, 7,916 *docras* of Jayadhar, 12,224 *docras* of Gadag No. 1 and 3,326 *docras* of Laxmi was sold by auction. The following premiums are reported to have been realised for the graded produce over the ungraded *kapas* of the respective varieties:—

- (i) Rs. 10 to 15, per *Nag* (1,244 lbs.) of *kapas* for graded Jayawant,
- (ii) Rs. 40 to 80 per *Nag* in the case of graded Jayadhar,
- (iii) Rs 20 to 30 per *Nag* of graded Gadag 1, and
- (iv) Rs. 150 to 300 per *Nag* of graded Laxmi.

One hundred and seven bales of Jayawant cotton were pressed under Agmark. Owing to lack of genuine demand for agmark cotton from the consuming mills, the system of agmarking is proposed to be discontinued under the new 'Jayadhar and Laxmi seed scheme' which replaces this scheme in the tract.

(iii) Scheme for cultivation of 1027 A.L.F. cotton in Nawapur Taluka:—This scheme was sanctioned by the Committee in January 1942, for a period of three years and it came into operation on the 4th May, 1942. The Committee was informed that the total area under cotton in the taluka had decreased from 25,000 acres in 1942-43 to 18,300 acres in 1943-44 and to 16,000 in 1944-45 and that, of this, the area covered with pure seed of 1027 A.L.F. distributed by the Department was only 10,000 acres.

The original object of the scheme was to cover an area of 25,000 acres in Nawapur taluka with 1027 A.L.F. cotton. During the extension period, it is proposed to continue the cultivation of 1027 A.L.F. in Nawapur taluka and at the same time consider the question of its replacement by other types, *e.g.*, Suyog or the other superior varieties which combine the high ginning of Suyog and the good spinning quality of 1027 A.L.F. and are suited to this tract.

A total quantity of 1,50,569 lbs. of seed was distributed during the year under review: 34,969 lbs. by the Agriculture Department and 1,15,600 lbs. by approved agents. The total area under departmental control was 3,509 acres. The seed obtained from this area would be sufficient to cover the whole cotton area of Nawapur taluka.

The results of the trials of Suyog and 1027 A.L.F. conducted in Nawapur taluka indicated that Suyog was superior to 1027 A.L.F. in respect of yield and ginning percentage, but inferior to it in spinning value. The question of replacing 1027 A.L.F. by Suyog has, therefore, been postponed till a final decision regarding the replacement of Suyog in the Surat tract by another superior variety is arrived at.

Previously cultivators generally sold their produce to the †*Sahukars* who used to get the **kapas* ginned and pressed separately. During the year under report, however, the cultivators formed themselves into groups and marketed their produce under the supervision of the Agriculture Department. The total quantity of certified 1027 A.L.F. seed cotton thus received during the season was 613 *bhars* (1 *bhar*—924 lbs.,) of which 605 *bhars* were 1027 A.L.F. certified and 8 *bhars* 1027 A.L.F. pedigreed. Certified produce was sold at a premium of Rs. 10-2-0 per *bhar* of seed cotton over the uncertified *kapas*. In all, 521 Agmark certified bales were produced. The calculated premium per bale is stated to be Rs. 11-5-0.

(iv) Scheme for multiplication and distribution of "Vijaya" cotton in Middle Gujerat:—This scheme was sanctioned by the Committee in July 1943, for a period of five years and it came into operation on the 1st December, 1943.

The object of the scheme is to completely replace Broach and B.D. 8 cottons by *Vijaya* cotton in the Nerbudda-Mahi and the Mahi Sabarmati zones of Middle Gujerat.

During the year under review, the estimated area under 'Vijaya' was 3,08,270 acres out of a total cotton area of 4,15,438 acres in Middle Gujerat excluding Baroda State, against an area of 2,14,566 acres out of a total cotton area of 2,27,616 acres in 1948-49. The Agricultural Department controlled a seed multiplication area of 34,790 acres (including 1208 acres grown with farm pedigree seed by the registered seed growers) against an area of 18,108 acres (including 1858 acres grown with farm pedigree seed) in the previous year. The total quantity of seed distributed by the Agricultural Department during the year was 7,17,255 lbs. against 7,66,475 lbs. in the previous year.

The Co-operative Cotton Sale and Seed Supply Societies distributed to cotton growers in parts of Broach and Kaira districts 3,84,000 lbs. of seed against 8,21,870 lbs. in the previous year. Thus the total quantity of pure *Vijaya* seed distributed amounted to 11,01,255 lbs. against 15,88,345 lbs. in the previous year. This reduction was due to the prevalence of famine conditions in the tract during 1948-49.

In all 11,497 full pressed bales of pure *Vijaya* cotton were obtained and disposed of from the controlled area. Owing to the traders being fully convinced of the intrinsic value of 'Vijaya', no difficulties were experienced in marketing the bales. The additional income as a result of growing 'Vijaya' cotton was estimated at Rs. 15|- to Rs. 20|- per acre.

(v) Scheme for distribution and multiplication of Vijaya cotton in Baroda:—This scheme was sanctioned in January 1944, for a period of five years and it came into operation on the 1st April, 1944. Its object

† Village money lender.

* Seed Cotton.

is to establish Vijaya cotton (seg 1-2 only) in the whole of the Broach cotton tract in Baroda district, lying between the Narmada & Mahi rivers.

During the year under report, the Department distributed 21,20,000 lbs. of seed to cover an area of 2,64,500 acres (against 2,33,606 acres in the previous year) out of a total cotton area of 3,25,000 acres in the tract.

The total quantity of improved cotton marketed by the Department was 13,22,300 standard * *maunds* and that by the cotton sale societies 1,32,928 standard *maunds*. The total number of bales agmarked by the Department was 18,829, of which 5,098-bales were from the pooled produce of cotton sale societies. The premium obtained for certified over non-certified lint was Rs. 4|- to Rs. 5|- per bale of 392 lbs.

It was estimated that the farmers growing Vijaya cotton on an area of 2,64,500 acres earned an additional income of Rs. 60,83,500|- in comparison with what they would have earned had they grown the ordinary B.D. 8 cotton.

(vi) Scheme for multiplication and distribution of Kalyan (K. 72-2) cotton in Ahmedabad district:—This scheme was sanctioned by the Committee in February 1947 for a period of five years and it came into operation on the 1st April, 1947.

The object of the scheme is to replace completely Wagotar cotton by Kalyan variety over an area of 3,30,000 acres in the Wagad tract of Ahmedabad district, comprising the talukas of Viramgam, parts of Sanad, Dholka, Dhandhuka and Deskroi.

During the year under review, 7,07,554 lbs. of Kalyan cotton seed was distributed to cover 34,025 acres against 53,525 acres programmed for. The reduction in acreage was attributed to severe famine conditions prevailing during the previous year.

Stages II and III were organised at Bavla centre. The operations pertaining to these stages were done through approved agents on commission basis under close supervision of the Agriculture Department. The produce of stages IV to VII was as usual purchased through the approved agents and the work of shelling the *kalas* (dry bolls with seed cotton) ginning of seed cotton, pressing of lint, stamping of bales and the distribution of the resultant pure seed were done under Departmental supervision. Arrangements were made for distributing about 16,00,000 lbs. of cotton seed sufficient to cover an area of 80,000 acres in 1950-51.

About 1,880 bales of Kalyan cotton were produced during the year 1948-49, of which 1,831 bales were certified by the Department. The lint of Kalyan variety realised, on an average, a premium of Rs. 2|8 to Rs. 3|- per maund of 40 lbs. over Local Wagad. In 1949-50 the estimated pro-

* 1 Maund 82-4 lbs.

duction of Kalyan cotton was about 9,000 bales, and the lint was stated to have realised a premium of Rs. 2|- to Rs. 5|- per maund of 40 lbs. over Local Wagad.

It was estimated that the farmers growing Kalyan cotton on 35,000 acres earned an additional income of Rs. 4,72,500|- in comparison with what they would have earned had they grown the ordinary Local Wagad.

(vii) Scheme for multiplication and distribution of Kalyan (K-72-2) cotton seed in Mehsana district:—The scheme was sanctioned by the Committee in March, 1948, for a period of three years and eight months and it came into operation on the 1st February, 1949. It aims at the complete replacement of Wagotar cotton by Kalyan over an area of about 2 lakhs acres in the Wagad tract of Mehsana district.

During the year under report, the area under Kalyan cotton was estimated at 1,375 acres against 2,411 acres programmed to be covered. The reduction in area was stated to be mainly due to severe famine conditions prevailing during the previous year.

Stage II was organised on Jagudan Farm, while stages III to VII were organised at other different centres. The roguing of stages II and III was done by the departmental staff, while stages IV to VI at different centres were only inspected for checking purity.

The estimated production was 1,300 bales. Kalyan cotton lint is said to have realised a premium of Rs. 2|- to Rs. 5|- per maund of 40 lbs. over local Wagad.

It was estimated that farmers growing this cotton on an area of 1,375 acres earned an additional income of about Rs. 15,468|- as compared with what they would have earned had they grown the Local Wagad.

(viii) Scheme for multiplication and distribution of Suyog cotton in Surat tract (South of river Norbudda):—This scheme was sanctioned by the Committee in July 1944 for a period of five years and it came into operation on the 1st April, 1945.

The object was to replace 1027 A.L.F. and 1A cottons by Suyog over an area of 2 lakhs acres in the Surat tract, lying South of the river Narmada, excluding Nawapur taluka of West Khandesh district. During the extension period it is proposed to cover an area of 3,60,000 acres, the increase in area being on account of the integration of Baroda, Rajpipla, Sachin and Bansda States with Bombay.

During the year under report, the Agricultural Department controlled an area of 74,524 acres as against 56,728 acres in the previous year. A total quantity of 29,87,637 lbs. of Suyog seed was purchased by the Department (against 9,94,593 lbs. in 1948-49) of which 25,34,870 lbs. was distributed for sowing. The number of pressed bales of certified Suyog cotton was 16,156 (against 5,452 in the previous year) of which 15,946 were ordinary certified agmark bales and 210 'pedigreed agmark

bales'. The cultivators are reported to have realised high prices for the produce this year also as the mills purchased it directly. A total of 15,448 bales were disposed of. The premium realised was stated to be about Rs. 12/- per bale of 'ordinary certified' cotton and about Rs. 20-3-0 per bale of 'pedigreed cotton' over the uncertified produce.

MADHYA PRADESH.

(i) **Scheme for distribution and marketing of Jarila cotton in Madhya Pradesh:**—A small scheme for the distribution of Jarila seed, sufficient for 1,000 acres each in 17 *tahsils** and for roguing the area thoroughly, was sanctioned by the Committee in January 1943, for a period of one year. It came into operation in September 1943. The present scheme was sanctioned in January 1944 for a period of three years from the 1st March, 1944. In November 1947, it was extended for a period of two years. The object of the scheme is to extend the cultivation of Jarila cotton in the Buldana district.

There was a gradual decline in the area under Jarila during the last four years owing to inability to withstand late rains and the inadequacy of the premium obtained for its produce. The variety has, therefore, been discarded by the cultivators except in Buldana district, to which it is now confined.

During the year under report the Department distributed 2,449 maunds of seed to cover an area of 13,500 acres in the Buldana District. The area covered in the previous year was 7,911 acres.

An arrangement was made with certain mills, which purchased the cotton from the pooling centres to return the seed to the Department. Under this arrangement the Department purchased about 3,724 maunds of seed for distribution in 1950-51.

(ii) **Scheme for the extension of area under Buri and Cambodia cottons in Madhya Pradesh:**—This scheme was sanctioned by the Committee in March 1948, for a period of the one year and in October 1949 it was extended for another year. The object of the scheme was to increase the area under Buri and Cambodia cottons by 1,00,000 acres.

District-wise particulars of the distribution of seed and the area covered during the year under report are given below:—

District.	Variety of cotton	Seed distributed (Mds.)	Area covered (including natural spread) (Acres)
1. Nimar	Buri 107	7,500	68,935
2. Amravati	Buri 167		
	Cambodia	9,464	94,792
3. Wardha	Cambodia	1,007	15,100
Total ..		17,971	1,78,827

* Tahsil means sub-division of a district.

It was stated that owing to the fixation of ceiling prices for cotton, the Departmental pools for the sale of improved cottons could not be operated during the year under report. To enable the Department to secure pure seed, a scheme was drawn up under which *kapas* was sold direct to the mills. The ginning and pressing was done under Departmental supervision and resultant seed was purchased by the Department at the market rate. As a result of the operation of the scheme, the total quantity of improved *kapas* of Buri and Cambodia marketed during the year is reported to be 24,248 Bengal maunds. 14,484 maunds of Buri and Cambodia seed were obtained for distribution in 1950-51.

MADRAS.

(i) **Scheme for maintenance of nucleus of pure seed of improved varieties of cotton in Madras State:**—This scheme was sanctioned by the Committee in January 1938 for a period of five years and came into operation on the 12th September, 1938.

The area selfed and the quantity of selfed seed produced during the year under report are given below:—

Name of variety.	Area selfed	Quantity of selfed seed produced.	How disposed of.
	<i>Acres.</i>	<i>lbs.</i>	
Co. 2	1.00	190	After reserving sufficient seeds for the nucleus area of 1950-51, seeds were transferred to the respective seed farms or sowing in the inner area in 1950-51
Co. 3	1.00	256	
K. 2	2.00	642	
H. 1	2.00	258	
No. 14	2.00	45	

(ii) **Scheme for multiplication, distribution and marketing of Co4 cotton in Madras State:**—This scheme was sanctioned by the Committee at its meeting held in February 1947 for a period of three years and it was put into operation on the 1st February, 1948.

The object of the scheme is to cover the entire *masipattam* (summer crop) area in Ramnad, Mathurai, Tirunelveli and South Arcot districts of Madras State with Co. 4 cotton and also to arrange for the distribution of Co4 seed in the districts of Coimbatore, Salem and Tiruchirappalli for cultivation in the cold weather.

During the year under report, a total quantity of 2,052 lbs. seed was distributed to sow the 'inner seed farm' area of 400 acres. In addition an 'outer seed farm' area of 2,600 acres was arranged as programmed. A total quantity of 7,190 bags of seed was purchased from the seed farm ryots who ginned their *kapas* under departmental supervision. The total area under Co. 4 during 1949-50 was estimated at 40,272 acres.

Seven thousand * *candies* of Co. 4 cotton were marketed and an average premium of Rs. 30|- per candy of 784 lbs. over the local cotton was obtained. It was estimated that the growers of Co. 4 cotton earned an additional income of Rs. 20,33,600|- in comparison with what they would have earned had they grown the local Cambodia.

(iii) Scheme for multiplication & distribution of G.I. Cotton in Guntur district of Madras State:—This scheme was sanctioned by the Committee in March, 1948 and it came into operation on the 26th August, 1948.

The object of the scheme is to replace the local cotton by the improved type G.I. in the Guntur district of Madras State.

During the year under report an area of 800 acres was sown under seed farms and it was expected that about 50,000 lbs. of pure seed would be obtained. The estimated total area under G. 1 during 1949-50 was 1,000 acres.

36,625 lbs. of *kapas* of seed farm produce were marketed at a premium of Rs. 10|- per *pothy* of 500 lbs. It was estimated that the growers of G.I. cotton earned an additional income of Rs. 19,500|-.

EAST PUNJAB.

Scheme for multiplication and distribution of L. S. S. American cotton in Ferozepore district:—This scheme was sanctioned by the Committee in November, 1947 for a period of five years and was put into operation on the 17th October, 1948. Its object is to establish L. S. S. cotton in the Ferozepore district and ultimately to make the district a 'protected' area for L. S. S. Cotton.

Stages I and II:—The bulked seed from the previous year was sown on an area of 0.75 acre and 5 maunds of seed were obtained which is to be utilised for further propagation over an area of 35 acres in stage II during *kharif* 1950. Under stage II, 36.5 acres were raised from the nucleus seed of the previous year. The produce from this area was ginned under departmental supervision and a total quantity of 166 maunds of seed was obtained for utilization in stage III during the following *kharif* season.

Stages III and IV:—Under stage III an area of 446 acres was sown and a total quantity of 2,000 maunds of seed was obtained, which was reserved for sowing in compact blocks with a few registered growers. 700 maunds of seed from stage III of the previous year was sown on an area of 5,600 acres in stage IV, of which 3,420 acres were rogued once and 1,867 acres twice. 8,000 maunds of pure seed were obtained from the rogued area which would be sufficient to cover an area of 64,000 acres in the 1950-51 *kharif* season.

* 1 Candy = 784 lbs.

A proposal was made to the State Government to promulgate the Punjab Pure Seed and Seedlings Act in Fazilka and Muktsar tahsils, which account for nearly 85% of the total cotton area in Ferozepore district.

About 10,700 maunds of *kapas* produced on the Government Farms and on the registered growers' lands were auctioned, realising a premium ranging from Re. 0-10-0 to Rs. 1-5-6 per maund.

MYSORE.

Scheme for multiplication and distribution of Sel. 69 and M.A. 5 in Mysore:—This scheme was sanctioned by the Committee in January, 1945, for a period of 5 years and it came into operation on the 1st June 1946.

The object of the scheme is to extend the cultivation of (i) Sel. 69, an improved Asiatic cotton, in the black soil tract of the State covering an area of about 64,000 acres and (ii) Mysore American, M.A. 5 in the red soil tract extending from 16,000 to 20,000 acres under rainfed and irrigated conditions.

Sel. 69:—Forty pounds of 'selfed' seed of Sel. 69 obtained from an area of 10 acres, were utilised to raise a pure nucleus crop at the Babbur Farm. The total area under Sel. 69 during 1949-50 was estimated at 2,960 acres against 450 acres in the previous year. Sel. 69 which is becoming increasingly popular was expected to cover at least 10,000 acres with it during 1950-51. *Kapas* of Sel. 69 fetched a premium of Re. 1-2-0 per maund of 28 lbs. over that of the Local and Jaywant varieties.

M.A. 5:—During the year under report, a total quantity of 1,26,576 lbs. of bulk of seed of M.A. 5 was distributed to cover an area of 9,000 acres. The final area under M.A. 5 during 1949-50, however, was only 5,290 acres, against 5,700 acres in the previous year. The decrease was said to be due to adverse seasonal conditions. A total quantity of 2,56,256 lbs. M.A. 5 seeds was collected for sowing in the following season. Arsikere, M.A. 5 fetched a price up to Rs. 16-8-0 per maund of 28 lbs. *kapas* against Rs. 14-0-0 obtained for the local Doddahathi cotton.

CHAPTER V

PROGRESS IN THE INTRODUCTION OF IMPROVED VARIETIES OF COTTON.

The area under improved varieties of cotton in the Indian Union during the year under review was estimated at 61,55,000 acres, or 52¼% of the total cotton area as compared with 56,28,000 acres or 50% of the total area in the previous year. The improved varieties in cultivation were mainly of medium and long staple types as it is the policy of the Committee to increase the production of such cottons. The production of long, medium and short staple cottons in the Indian Union during the last 6 years together with the corresponding averages during the quinquennium 1939-44 is shown below:—

(In thousand bales of 392 lbs. net).

Year (1st September to 31st August).	Production (Based on official cotton forecasts).			
	Long staple (7/8" and above.)	Medium staple (Below 7/8" and above 11/16").	Short staple (11/16" and below)	Total
Average 1939-44	755 (19)	1,886 (36)	1,771 (45)	3,912
1944-45	465 (21)	1,101 (50)	656 (29)	2,222
1945-46	410 (19)	1,074 (50)	678 (31)	2,162
1946-47	404 (19)	1,043 (49)	721 (32)	2,168
1947-48	319 (15)	1,119 (51)	750 (34)	2,188
1948-49	309 (18)	881 (50)	577 (32)	1,767
Average 1944-49	381 (18)	1,044 (50)	676 (32)	2101
1949-50	492 (19)	1,345 (51)	791 (30)	2628

N.B.—Figures within brackets indicate percentages of total production.

It will be seen that the proportion of long staple cotton in the total production during the year under review was 19% against 18% in the previous season. The figure of production of cotton in 1949-50 shown in the above table is the official estimate adjusted on the basis of the relationship between the averages of official and non-official estimates of production for the previous two years, whereas the official estimates of production for the previous years, however, have not been similarly adjusted.

The figures of yield per acre of cotton based on two sets of data, viz., the official estimates of production and the estimates of actual crop calculated from cotton pressed, cotton consumed in mills, extra factory consumption, etc., are given in the following table for the last 6 years

together with the corresponding averages for the quinquennium 1939-44:—

Year (1st Sept. to 31st August).	Area (Thousand acres.)	Production as per Government Estimates. (Thousand bales of 392 lbs. net)	Yield per acre on the basis of Government Estimates of production	*Approximate commercial crop. Thousand bales of 392 lbs. net.)	Yield per acre on the basis of commercial crop.
1	2	3	4	5	6
Average 1939-44 ..	18,891	3,912	lbs. 88	4,417**	Lbs. 94
1944-45	11,413	2,222	76	2,734**	94
1945-46	11,849	2,162	75	2,539**	88
1946-47	11,689	2,168	78	2,549**	86
1947-48	10,655	2,188	81	3,030	111
1948-49	11,298	1,767	61	2,834	81
Average 1944-49 ..	11,280	2,101	73	2,637	92
1949-50	12,173	2,628	85	2,927	94

*Best estimate of the crop as arrived at by the Indian Central Cotton Committee in connection with the annual *post-mortem* of official cotton forecasts.

**Separate details for India and Pakistan are not available and those for India given in the above table are based on the assumption that the actual crop figures for the two Dominions would be in the same proportion as the corresponding official estimates of production.

It will be seen that the average yield per acre as estimated from the commercial crop was about 94 lbs. in 1949-50. The average yield per acre in both the quinquennia 1939-44 & 1944-49 was about the same.

The main principle adopted by the Committee in making its recommendations for the spread of improved varieties of cotton is the extra income to the grower. On the basis of the data furnished by the various States in respect of the improved varieties, for the extension of which special seed distribution schemes were in operation, it is estimated that the additional income earned by the growers of improved varieties in the country during 1949-50 was about Rs. 5.25 crores.

The progress made in the introduction of improved varieties of cotton in the major cotton growing States is dealt with below:—

BOMBAY STATE.

The total estimated area under cotton in the State during 1949-50 including the merged areas was 24,20,174 acres.

Broach tract:—The total area under cotton in this tract (including the merged areas of the former Baroda State) during the year 1949-50 was 7,02,303 acres. The improved variety under cultivation is 'Vijay' of which the estimated area was 6,30,604 acres. The Agricultural Department had distributed 34,08,015 lbs. seed of Vijay cotton.

Wagad tract:—Out of the total cotton area of 2,91,370 acres, in Ahmedabad and Mehsana districts, the area under the improved variety “Kalyan” was 36,375 acres. The quantity of seed of “Kalyan” distributed by the Agricultural Department was 7,55,339 lbs. Out of the total area of 36,375 acres under “Kalyan”, 12,570 bales were produced which fetched Rs. 40|- to Rs. 100|- more per khandi of lint as compared to Local Wagad.

Khandesh tract:—“Jarila” is the principal variety in cultivation in Khandesh, occupying 2,27,185 acres in 1949-50 season. An area of 92,500 acres was under the supervision of the Agricultural Department, which distributed 20,37,400 lbs. of pure Jarila cotton seed. During early stages of the crop, the rains and other conditions were quite satisfactory. Late rains greatly affected the yield and quality of cotton crop. Average yield was 280 lbs. per acre and was better than the previous season. The public continued to agitate against the variety. The cultivators got satisfactory prices for seed-cotton.

The Cotton Control and Transport Acts continued to be in operation during the year and there was no other variety in general cultivation.

Multiplication of the seed of the new improved variety 197-3 was taken up and 2,291 lbs. of seed were given to selected growers for multiplication.

Surat tract:—Against the total area of 3,54,021 acres under cotton, Suyog covered 2,72,947 acres. Of this, 74,524 acres were under the control of the Agricultural Department which supplied 25,34,870 lbs. of pure Suyog seed. The produce of the controlled areas was ‘agmarked’ under the Grading and Marking Scheme financed by the Committee and 16,156 agmarked bales were sold. The certified produce realised a premium of Rs. 10|- per *Bhar* (924 lbs.) of seed-cotton over non-certified produce.

Under the scheme for cultivation of 1027 A.L.F. cotton in the Nawapur Taluka of West Khandesh district, the whole area under cotton in the Taluka comprising 8,440 acres was covered with 1027 A.L.F. The total quantity of seed supplied by the Department was 1,50,569 lbs. In all, 521 Agmarked bales of 1027 A.L.F. were sold, the average premium realised by certified over non-certified seed cotton being Rs. 10|2 per *Bhar* (924 lbs.)

Kumta-Dharwar tract:—The total estimated area under cotton during 1949-50 in the five cotton growing districts of Dharwar, Belgaum, Bijapur, Kolhapur and South Satara of the Bombay Karnatak was 8,30,600 acres. Four improved varieties namely Jayawant, Gadag, Jaydhar, Laxmi are under cultivation in the tract. The total quantities of improved seed distributed by the State Agricultural Department and the

estimated area of each variety in the year under review were as follows:—

Variety	Quantity of seed distributed. (lbs.)	Area covered		Total
		By Dept. seed (acres)	By Non-dept- seed (acres)	
(1)	(2)	(3)	(4)	(5)
Jayawant	89,98,020	3,87,178	1,68,149	5,05,822
Gadag 1	9,19,800	98,647	58,890	1,52,087
Jaydhar	1,24,820	11,222	8,000	19,222
Laxmi	66,800	6,756	....	6,756

MADRAS STATE.

The total estimated area under cotton in the State during 1949-50 was 16,52,000 acres, as compared with the average area of 15,59,000 acres for the quinquennium 1945-50 and represented 14 per cent of the all-India cotton acreage. The total production during the year under review (3rd September, 1949, to 1st September, 1950) computed on the basis of the figures of cotton pressed and loose cotton consumed by mills is estimated at 3,75,072 bales.

Cambodia tract:—The total estimated area under Cambodia cotton in the State during 1949-50 was 2,45,200 acres. Among the improved strains which occupied 1,89,342 acres and covered 77% of the total area under Cambodia cotton as against 74% covered in 1948-1949, improved strains, Cambodia 2, Cambodia 3 and Madras Uganda 1 continued to be popular. They occupied 1,31,923, 15,175 and 38,899 acres, respectively. The strain Cambodia 2 being cosmopolitan figured in all the districts and continued to occupy the largest single area, covering 53% of the total area under American cotton. The area under Uganda 1 showed an increase of 17% compared to the previous season. Strains 920 and 4463 occupied respectively 300 and 3,045 acres. The total quantity of seeds of improved strains distributed in the tract, 10,69,948 lbs., was supplied by the Agricultural Department and 17,310 lbs. by the co-operative societies.

Tinnevellies tract:—The total area under Tinnies during 1949-50 was 4,90,100 acres as against 5,34,000 acres in the previous season indicating a decrease of 8%. The estimated acreage of 2,05,915 under improved Karunganni strains K. 1, K. 2 and K. 5 which covered 1,33,891, 12,121 and 59,903 acres, respectively formed 42% of the total area under Tinnies, the proportion being practically the same as in the last year. The quantity of improved seeds distributed by the Department of Agriculture was 82,674 lbs. while the co-operative societies distributed 35,360 lbs.

Salem tract:—The area under Salems increased from 11,300 acres in 1948-49 to 12,500 acres in 1949-50, registering a rise of 9%. Improved strain Karungani 5 occupied 20% of the Salems area, covering 2,561 acres in Tiruchirapalli district. The Agricultural Department distributed 28,851 lbs. of Karunganni 5 seeds in the tract.

White and Red Northern tracts:—The area under cotton in this tract was 1,16,000 acres in 1949-50 and Northern 14 was the only improved strain in cultivation. It covered an area of 24,000 acres.

Western tract:—The area under Westerns cotton in the district of Bellary, Anantapur, Cuddapah and Kurnool was estimated at 5,63,000 acres during 1949-50, out of which the improved strain Westerns 1 occupied an area of 4,85,440 acres, or 86% of the total area under this variety. The Agricultural Department distributed 2,04,920 lbs. of Westerns 1 seeds in the tract.

Warangal and Cocanada tracts:—The estimated area under this cotton was 68,300 acres in 1949-50. Strain Cocanada 1 was again found promising for the tract, and was grown on 3,957 acres. A total quantity of 8,151 lbs. of seeds of this variety was distributed by the Agricultural Department for further multiplication.

MADHYA PRADESH.

The total estimated area under cotton in the State during 1949-50 was 27,70,970 acres, as against 32,72,504 acres in 1942-43. Even though the area has been gradually falling, the State of Madhya Pradesh has the largest acreage under cotton as compared to other States in the Indian Union. The total production during 1949-50 is about 3 lac bales.

The names of the improved varieties, the tracts in which they are grown, and the area covered by each in the last two years are given below:—

Variety	Districts in which grown	Area in acres	
		1948-49	1949-50
Buri	Nimar	56,522	86,054
Cambodia	Wardha & Amraoti	1,17,137	1,16,117
Jarila	Buldana, Akola, parts of Amraoti & Nimar	13,46,182	11,50,644
Verum	Yeotmal	3,08,150	2,81,282

Whereas the area under Jarila and Verum has fallen, that under Cambodia is more or less unchanged, and under Buri has increased by about 30,000 acres.

PUNJAB STATE.

The total area under cotton in the State during the year 1949-50 was 3,21,800 acres as compared to 2,28,200 acres during the year 1948-49. Out of this, 88,700 acres were occupied by American cotton and the rest by *desi*. The total production was 50,000 bales in case of American and 1,05,000 bales in case of *desi*.

Ferozepore district:—This is the most important cotton growing tract in the State. The total area under cotton in this district was 1,30,900 acres, out of which 84,400 acres were under American cotton and the rest under *desi*. Of the improved varieties of cotton grown in this district, the American variety, L.S.S., occupied an area of 80,200 acres, while 4-F American variety was grown on 4,100 acres. *Desi* variety, represented mostly by 'Kapara' (a mixture of white and yellow flowered biotypes) occupied 19,900 acres. The Department of Agriculture distributed 4,400 maunds of pure L.S.S. cotton seed.

Haryana tract:—(Hissar, Rohtak, Karnal and Gurgaon):—The total area under cotton in this tract was 76,100 acres, out of which 3,900 acres were under American cotton and the rest under *desi*. This tract is second to Ferozepore district, so far as cultivation of American cotton is concerned. The most important improved variety of American of this tract is 216F which occupied an area of 3,000 acres. *Desi* cotton represented mostly by Mollisoni 60-A2 was grown on an area of 50,600 acres. The Department supplied 370 maunds pure seed of 216F American cotton.

Central districts:—(Amritsar, Jullundur & Ludhiana):—The total area under cotton in this tract during the year under report was 80,300 acres, out of which 20,300 acres were under the improved Mollisoni 39 cotton. The area covered by the improved variety is by the natural spread and no fresh seed was supplied by the Department of Agriculture.

Sub-montane tract:—(Gurdaspur, Hoshiarpur, and Ambala Districts):—This tract is not an important cotton growing area. Cotton produced here is mostly used for domestic purposes. The total area under cotton during the year under report was 32,400 acres, out of which 16,700 acres are reported to be occupied by the *desi* improved variety, Mollisoni 39. The latter area has been covered mostly by natural spread and the Department supplied no fresh seed of the improved variety during the year under report.

UTTAR PRADESH.

Total area under cotton:—The total area under cotton in the State during 1949-50, excluding the merged States of Rampur and Banāras, was 1,05,393 acres against 1,16,322 acres for the previous year, showing

a decrease of 9.4 per cent, which was ascribed to the high prices of food crops, late commencement of rains and comparatively poor yields of cotton in the few preceding years. As compared with the average area for the quinquennium 1943-48, the area during the year 1949-50 recorded a decrease of 51.6 per cent. The position of cotton in Uttar Pradesh deteriorated so much that its total production fell short even of the quantity required for village or extra-factory consumption.

Western Uttar Pradesh:—This is the major cotton growing tract of this State. The total area under cotton in this tract during the year was 80,940 acres. The improved varieties under cultivation are C. 520, Perso-American and 351, of which the estimated area was 2,885 acres, 1,459 acres and 150 acres, respectively. The quantity of seed of C. 520 distributed by the Department of Agriculture during the year was 1,395 lbs.

Rohilkhand:—The total area under cotton in Rohilkhand was 21,516 acres, out of which 343 acres were under the Perso-American cotton.

Bundelkhand:—The total area under cotton during the year was 387 acres, out of which 26 acres were sown with the Perso-American variety.

Central Uttar Pradesh:—The total area under cotton in this tract was 2,550 acres, out of which 301 acres were under C. 520 and 80 acres under Perso-American.

HYDERABAD STATE.

The total area under cotton in the State in 1949-50 was 2,12,200 acres as against the average of 20,83,300 acres for the five years 1945-49 and represented 18.03 per cent of all-India cotton acreage. The total production during this year was 2,53,000 bales representing 12.15 per cent of the all-India production.

Hyderabad Gaorani tract:—The total cotton in this tract was 5,99,444 acres. The improved varieties, Gaorani 6, Gaorani 6E-3 and Goarani 12 covered an area of 2,31,870 acres, representing 38.7 per cent of the cotton area in this tract. The area under Gaorani 6, Gaorani 6E.3 and Gaorani 12 was 1,97,700, 19,230 and 14,940 acres, respectively.

Hyderabad American tract:—The total area under cotton in Adilabad district was 1,48,230 acres. Of this, an area of nearly 20,000 acres had been reported in the past to be under natural spread of Parbhani American cotton in the *ghat* areas of this district from seed given to a cultivator some years ago. In view of its long staple, good yield, resistance to jassids and its suitability to a potential area of 1,20,000 acres in the four taluqas of Adilabad, Boath, Utnur and Kinwat, a beginning was made in 1949-50 for the Departmental distribution of pure seed of Parbhani American on 30,320 acres.

Hyderabad Kumpta tract:—This tract consisting of Raichur and Gulbarga districts grows Kumpta cotton to the extent of 6,85,000 acres. An area of 1,00,000 acres consisting of the taluqas of Gangawati, Ling-sugar, Kushtagi, Yelbarga and Kopbal forms a Protected Area for Jayawant cotton. In the year under report, the Department distributed seed for 2,800 acres of Jayawant, the remaining area of 97,200 acres being sown with natural spread of Jayawant seed.

In the remaining areas in Raichur district, seed of Raichur Kumpta 19 was distributed for 7,723 acres.

Hyderabad Oomras tract:—This tract of nearly 6,50,000 acres and comprising the districts of Aurangabad, Bhir and the five taluqas of Parbhani district not included in the Gaorani Protected Area, grows mixed Jarila. Until this year no seed of any improved variety was distributed by the Department. In the year under review seed of Gaorani 12 was supplied for about 4,875 acres.

MYSORE STATE.

The total estimated area under cotton in the Mysore State during 1949-50 was 68,865 acres as against the average area of 57,270 acres for the quinquennium 1945-49, and represented 0.7% of the all-India cotton area.

The total production during the year under review on the basis of the figures of cotton pressed and loose cotton consumed by mills is estimated to be roughly 20,000 bales.

Mysore district:—(South Mysore):—The cotton tract in this district may be divided into two broad zones: (1) the major red soil, 25-35" rainfall tract in the west and south-west of the district, where long staple and medium staple cottons are usually grown, and (2) the small black soil, 18-25" rainfall tract where short and medium staple cottons are grown.

The total area under all cottons in this District was 3,329 acres. The improved long staple variety M.A.V. occupied an estimated area of 1,700 acres inclusive of natural spread, against 426 acres in 1948-49. Of the total area under the improved variety, 292 acres were sown with departmental seed for which 4,088 lbs. of seed were supplied.

In the short and medium staple zone, 75 acres were sown with departmental improved variety, Sel. 69 for which 525 lbs. of seed were supplied.

Hasan district:—(West Mysore):—This is purely a red soil, 25-35" rainfall, medium and long staple cotton tract.

Out of the total area of 3,075 acres during the year under report, the departmental improved variety of long staple cotton, M.A.V. occupied 2,996 acres against 2,842 acres in 1948-49. Of the area under the improved variety 2,496 acres were sown with Departmental seed for which 24,960 lbs. were supplied.

Chikmagalur district:—West (Mysore):—This is again principally a medium and long staple cotton tract.

The entire area of 669 acres in this tract was occupied by the departmental improved variety M.A.V. and 6,690 lbs. of seed were supplied solely by the Department.

Shimoga district:—(North-West Mysore):—The total area under cotton in this district during 1949-50 was 4,635 acres. Of this area, the departmental improved long staple cotton M.A.V. occupied 316 acres and the medium staple cotton Sel. 69, 75 acres; the entire area under improved varieties was sown with departmentally distributed seeds and a total quantity of 3,535 lbs. of seeds was supplied by the Department.

Chitaldrug district:—(North Mysore):—The total area under cotton in this district was 55,442 acres. In the small pockets of red soil, M.A.V. the improved long staple variety occupied 1,447 acres against 602 acres during 1948-49. This entire area was sown with 10,129 lbs. of pure seed supplied by the Agricultural Department. 3,060 acres in the black soil tract was under the departmental improved variety, Sel. 69, against 440 acres in 1948-49. A total quantity of 13,800 lbs. of departmental seeds was issued to sow this area.

PATIALA AND EAST PUNJAB STATES' UNION.

The total estimated area under cotton in PEPSU during 1949-50 was 1,88,528 acres as against an average of 1,87,640 acres for the 3 years 1947-49. The total production during the year under review on the basis of figures of cotton pressed and loose cotton consumed by mills, was estimated at 1,00,549 bales.

Bhatinda district:—This is the most important cotton growing tract in the Union. Both *Desi* and American cottons are cultivated under canal irrigation. The area under *Desi* was 54,229 acres and under L.S.S. American 9,274 acres.

Barnala district:—Both *Desi* and American cottons are grown in this district, partly under wells and partly under canals. 36,200 acres were under cotton last year out of a total cultivated area of 6,39,747 acres. This represents 20% of the area under cotton in the whole Union.

Sangrur district:—Out of the total cultivated area of 7,86,722 acres, 54,500 acres were under cotton. A small area was under the American

varieties L.S.S. and 216F. All the remaining area was under short staple *Desi* cotton.

Fatehgarh Sahib:—It is a submontane region having humid climate. Irrigation source is wells. Its western zone is suitable for growing cotton. An area of 16,556 acres out of a total cultivated area of 2,10,425 acres was under cotton. 216F is being popularised in this area.

Patiala district:—Irrigation is done by canals as well as wells. Soil is clay loam. The whole area under cultivation was 4,13,195 acres, out of which only 13,738 acres were under cotton. No improved variety is grown in this district.

Kapurthala district:—It is a wet region, less important from cotton point of view. There was only an area of 3,096 acres under cotton crop out of the total area of 1,13,934 acres under cultivation. Experiments have been laid for the last two years to try 216F in this area. So far the results have been encouraging.

MADHYA BHARAT STATE.

The total acreage under cotton in the State in the year 1949-50 was 11,89,553 acres as against the average area of about 10.50 lakhs acres for the past 2 years, and represented 9.4% of the all-India cotton acreage.

Nimar tract:—The total area under cotton in this tract in the year under review was 3,71,000 acres. The area under improved varieties was 3,09,000 acres as shown below:—

Buri 107	..	..	..	1,75,000 acres.
Jarila	..	..	..	1,34,000 acres.

The Department of Agriculture supplied seed for 24,742 acres of Buri 107, and 6,223 acres of Jarila. The quantity of improved seeds distributed by the Department was 4,88,320 lbs. of Buri 107 and 1,24,400 lbs. of Jarila. The average premium fetched by cotton sown with the departmental seed was Rs. 12|- per *mani* of 960 lbs. for Buri 107 and Rs. 5|- per *mani* for Jarila.

Malwa tract:—In this tract the improved varieties grown were Malvi-9, Cambodia, Indore-2, Jarila and G. 16. The total cotton acreage for the year under report was 8,18,553 acres. The acreage under improved strains was about 3,15,000 acres, variety-wise distribution of which was as follows:—

Variety.	Acreage.
Malvi-9	2,33,518
Cambodia	12,512
Indore-2	2,000
G. 16	15,000
Jarila	16,000

The quantity of improved seed distributed by the department was 1,84,440 lbs. and the area covered 9,372 acres. The premium for cotton grown with the departmental seed was Rs. 12/- per *mani* for Indore-2 and Rs. 5/- for Malvi-9 and Jarila.

CHAPTER VI

COTTON MARKETING, LEGISLATION AND OTHER PROTECTIVE MEASURES.

(i) **Cotton Export Policy:**—In November 1949, the Government of India announced its export policy for the year 1949-50. The export of Assam and Comilla varieties of cotton was allowed freely to all permissible destinations from Calcutta port and of Bengal *deshi* and Mathlo varieties freely to hard currency countries from all ports. The total exports for the year ending 31st August, 1950, amounted to 2.35 lakh bales.

(ii) **Cotton Import Policy:**—Due to the short cotton crop in 1948-49, the supply position of raw cotton to the Indian mills became very tight towards the end of the 1948-49 season. To ease the situation, the Government of India allocated, in March, 1950, dollar exchange to the extent of Rs. 28/- crores for the import of U.S. cotton, Rs. 7/- crores being provisionally reserved for the import of one lakh bales of $\frac{7}{8}$ " staple cotton on Government account. In April, 1950, a further allocation of dollar exchange for Rs. 14/- crores was made for the import of cotton stapling 1-1/8" and above. The total quantity of American cotton imported from January to August 1950, was the equivalent of about 4,93,000 bales of 392 lbs. each. In order to maintain the production of yarn of medium counts for supply to the handloom industry and to avoid any increase in the price of such yarn, the Government of India decided to subsidize the 7/8" staple cotton imported on Government account for supply to pure spinning mills at a price equal to the ceiling price fixed by the Government of India for similar varieties of Indian cotton. Due to negotiations for bulk purchase of Sudanese cotton falling through, the Government of India in February, 1950, permitted the import of Sudanese cotton through the normal trade channels. The importers and mills were also permitted to bid at public auctions for the purchase of East African cottons not covered by the bulk purchase agreement.

The total foreign exchange provided by the Central Government during the 1949-50 season was sufficient to import the equivalent of about 12.5 lakhs bales of 400 lbs.

(iii) **Regulated Cotton Markets:**—In the past, the Cotton Committee had recommended to the State Governments that they should establish regulated markets for the orderly and remunerative marketing of cotton. Accordingly, legislation for the establishment of regulated mar-

kets had been enacted in the States of Bombay, Madras, Punjab, Madhya Pradesh and Hyderabad and in the former State of Indore. In the year under report, 55 regulated markets were functioning in the State of Bombay under the Agricultural Produce Markets Act. In the Punjab, 58 market committees were working in 1949-50 and the Act has been extended to 3 more areas where, however, market committees have yet to start functioning. In Madras, 3 regulated markets continued to function at Tirupur, Adoni and Nandyal. In the Hyderabad State under the Hyderabad Agricultural Produce Markets Act, 54 regulated markets functioned during the year under report as against 49 in the previous year. The markets continued to work satisfactorily.

(iv) **Agmarking:**—During the year, Agmarking of cotton bales continued at Hubli, Gadag, Bailhongal and Savanur of Bombay State. Affixing of "Agmark" serves as a guarantee of purity of cotton. Agmark labels are affixed to bales of cotton, the ginning and pressing of which have been supervised by a special staff. The Committee is also helping co-operative societies and growers in the Surat area to market 1027 A.L.F. and Suyog cottons under a guarantee of purity under the Agricultural Produce (Grading and Marking) Act, 1937.

(v) **Cotton Baling Hoops:**—The arrangements for the distribution of cotton baling hoops were continued along the lines of the past year. During the year under report, 6,693 tons of hoops were distributed to pressing factories in the country through the agency of this office working in conjunction with the Iron and Steel Controller. On the recommendation of the Baling Hoops Advisory Committee, the Government of India announced their decision not to fix any maximum rate for pressing cotton during the 1949-50 season, due to the differences in prices of indigenous, English and American hoops, a short crop and a marked rise in the price of coal and wages of labour.

(vi) **Other requirements of Ginning and Pressing Factories:**—The arrangements for the supply of coal, under priority to cotton ginning and pressing factories on the recommendation of this office working in conjunction with the Textile Commissioner, Bombay, were continued during the season under report. The total quantity of coal recommended by this office for supply to ginning and pressing factories during the year amounted to about 97,000 tons. In addition, assistance was given to the factories in the matter of obtaining iron and steel required for maintenance and repairs.

(vii) **Dismantling of Cotton Ginning and Pressing Factories:**—As in the previous years, this office continued to deal with applications for the grant of permission for the dismantling of cotton ginning and pressing factories, referred for opinion by the Textile Commissioner, Bombay.

(vii) Legislation to maintain the purity of cotton and other protective measures:—Several legislative measures have been passed by the Central and State Governments on the recommendation of the Indian Central Cotton Committee with a view to checking the spread of undesirable or inferior types of cotton, insect pests and diseases and malpractices in marketing. A brief account of the working of these measures during the year under review is given below. For more details, previous reports may be referred to.

(a) Cotton Transport Act:—The Cotton Transport Act, in so far as it relates to rail and road transport, had been applied to the East Khandesh and parts of West Khandesh and Nasik districts of Bombay State in 1947. In 1948-49 these restrictions were extended to river transport as well. The Act continued to be in operation in the Kumpta-Dharwar, Bagalkot and Bijapur Protected Areas.

(b) Cotton Ginning and Pressing Factories Act:—On the recommendation of the Committee, the Government of Madras have passed the Cotton Ginning and Pressing Factories (Madras Amendment) Act, 1948, providing, *inter alia*, for the prevention of watering, mixing and adulteration of cotton. The U.P. Cotton Ginning and Pressing Factories Act, 1949, passed during 1948-49, contains similar provisions. The Committee has requested both the State Governments to enforce as early as possible the provisions relating to mixing of cotton.

(c) Prevention of Introduction of Foreign Cotton Pests:—In order to prevent the introduction of the Mexican Boll Weevil (*Anthonomus Grandis*) into India with imported American Cotton, regulations were imposed by the Government of India under which the import of American cotton is prohibited except through the Port of Bombay. The law also requires that all imported American cotton is fumigated with hydrocyanic acid gas at the port of entry. From July, 1950, the import of American Cotton has also been permitted through the Port of Madras, where, arrangements for fumigation of the cotton with hydrocyanic acid gas were made by the Directorate of Plant Protection and Quarantine, Government of India. The work of fumigation at the Port of Bombay was carried out under the supervision of the Secretary, Indian Central Cotton Committee as in the past. The cost of fumigation was met by the levy of a small fee from importers on each bale of American cotton imported and fumigated. During the year under review 4,19,220 bales of American cotton were imported and fumigated at the Port of Bombay.

The restrictions on the import of foreign *kapas* (unginned cotton) and foreign cotton seed remained in force throughout the year.

(d) Cotton Control Act:—Cotton Control Acts are in operation in the States of Madras, Bombay and Madhya Pradesh.

The Madras Cotton Control Act had for its object the eradication of the short staple 'Pulichai' cotton in certain areas growing improved varieties. The Bombay Cotton Control Act empowers the State Government to fix the standard varieties that can be grown in particular areas and to prohibit the growing, possession or trade in other varieties in these areas. The Act further provides penalties for the mixing of standard with prohibited varieties of cotton and of one standard cotton with another. The Government of Bombay have relaxed from the 29th April, 1950, the restrictions imposed under the Cotton Control Act relating to the growing of Jarila in the Khandesh tract. The Central Provinces Cotton Control Act prohibits the cultivation, possession or trade in the inferior short staple Garrow Hill Cotton. The Punjab Improved Seeds and Seedlings Act, 1949, the object of which is to compel the cultivators to sow the seed of only improved varieties in specified areas, has been made applicable to two tahsils of Ferozepur district and 28 villages of Hissar district in 1949-50.

K. SAWHNEY
Secretary

APPENDIX I.

MEMBERS OF THE INDIAN CENTRAL COTTON COMMITTEE.

- (1) *President*, Sardar Datar Singh, Vice-Chairman, Indian Council of Agricultural Research, *ex-officio*.

The Agricultural Commissioner with the Government of India, *ex-officio*.

- (2) *Representatives of Agricultural Department:—*

<i>Madras</i>	..	..	..	Shri R. M. Sundaram.
<i>Bombay</i>	..	..	..	Dr. B. N. Uppal.
<i>Uttar Pradesh</i>	..	..	..	Dr. S. B. Singh.
<i>Madhya Pradesh</i>	..	..	..	Dr. R. J. Kalamkar.
<i>Punjab</i>	..	..	..	Sardar Lal Singh.

- (3) *The Director of Commercial Intelligence and Statistics, ex-officio.*

- (4) *Representatives of Chambers of Commerce and Associations:—*

The East India Cotton Association	..	Shri Purshotamdas Thakurdas.
The Bombay Millowners' Association	..	Shri Bhagwandas C. Mehta.
The Bombay Chamber of Commerce	..	Mr. L. F. H. Goodwin.
The Indian Merchants' Chamber	..	Shri Chimanlal B. Parikh.
The Ahmedabad Millowners' Association	..	Shri Madanmohan Mangaldas.
The Tuticorin Chamber of Commerce	..	Mr. A. Mueller.
The Upper India Chamber of Commerce	..	Shri J. K. Srivastava.
The Empire Cotton Growing Corporation	..	Mr. C. P. Bramble.

- (5) *Commercial Representatives nominated by Central Government:—*

<i>Madhya Pradesh</i>	..	..	..	Shri R. V. Deshmukh.
				Shri Kisanlal Goenka.
<i>Madras</i>	..	..	..	Shri C. M. Kothari.
<i>Punjab</i>	..	..	..	Shri Ram Narain Varmani.

- (6) Bengal Representative Dr. N. Dutt.
- (7) Co-operative Banking Representative .. Shri R. G. Saraiya.
- (8) Representatives of Cotton Growing Industry:—
- | | | |
|----------------|-------|---------------------------------------------------------------|
| Madras | | Shri A. K. D. Balaram Raja.
Shri M. Lakshmikantha Reddy. |
| Bombay | | Shri F. B. Loxmeshwar.
Shri S. R. Rane. |
| Uttar Pradesh | | Major Nawab M. Jamshed Ali Khan.
Lala Basant Lal Agarwala. |
| Madhya Pradesh | | Shri S. K. Wankhede.
Shri P. S. Patil. |
| Punjab | .. .. | Sardar Waryam Singh. |
- (9) Representatives of Indian States and States' Unions :—
- | | | |
|----------------------------------------|-------|-----------------------------|
| Mysore State | .. .. | Dr. L. S. Doraswamy. |
| Madhya Bharat | .. .. | Shri K. I. Thadani. |
| United State of Rajasthan | .. .. | Dr. T. S. Sabnis. |
| United State of Vindhya Pradesh | .. .. | Shri Narayan Dass Mukerjee. |
| Patiala & East Punjab States' Union | .. .. | Sardar Kartar Singh. |
| United State of Kathiawar (Saurashtra) | .. .. | Seth Bhogilal M. Shah. |
- (10) Additional Members nominated by the Central Government :—
- | | |
|-----------------------------|-------------------------------|
| Shri Chunilal B. Mehta. | Shri Biswanath Das. |
| Shri Shankar Lal. | Shri Bhawanji A. Khimjee. |
| Shri B. K. Kaul. | Shri Neville Wadia. |
| Shri A. S. Lall. | Shri T. P. Barat. |
| Mr. D. N. Mahta. | Shri G. B. Patel. |
| Pandit Thakar Das Bhargava. | Shri R. Balasubramania Ayyar. |
| Seth Issardas Varindmal. | Mr. M. A. A. Ansari. |
| Dr. V. K. R. V. Rao. | Sardar Ujjal Singh. |

APPENDIX II.

SUB-COMMITTEES.

Standing Finance Sub-Committee:—Shri R. G. Saraiya (Vice-President). Chairman; Sardar Datar Singh (President) (ex-officio). Shri Purshotamdas Thakurdas; Shri Chunilal B. Mehta; Shri Chimanlal B. Parikh; Shri Bhagwandas C. Mehta; Mr. D. N. Mahta; Mr. L. F. H. Goodwin and Shri S. K. Wankhede.

Local Sub-Committee:—President (Sardar Datar Singh); the Vice-President (Shri R. G. Saraiya); Shri Purshotamdas Thakurdas; Shri Chunilal B. Mehta; Shri Bhagwandas C. Mehta; Mr. D. N. Mahta; Mr. L. F. H. Goodwin; Shri Chimanlal B. Parikh; Shri F. B. Loxmeshwar; Dr. B. N. Uppal, Mr. A. Mueller and Shri Bhawanji A. Khimji.

AGRICULTURAL RESEARCH SUB-COMMITTEE.

- I. *The President*:—Sardar Datar Singh (*ex-officio*).
- II. *The Vice-President*:—Shri R. G. Saraiya.
- III. *The Co-operative Banking Representative*:—Shri R. G. Saraiya (*Ex-officio*).
- IV. *Cotton Growers' Representatives*:—Mr. C. P. Bramble, Shri S. K. Wankhede and Shri P. S. Patil.
- V. *Cotton Trade Representatives*:—Shri Purshotamdas Thakurdas, Shri Chunilal B. Mehta, Mr. A. Mueller, Mr. L. F. H. Goodwin and Shri Kisanlal Goenka.
- VI. *Agricultural Officers*:—The Agricultural Commissioner with the Government of India (*ex-officio*); Mr. D. N. Mahta; Shri R. M. Sundaram; Shri P. D. Nair; Dr. B. N. Uppal; Dr. S. B. Singh Shri K. I. Thadani; Sardar Kartar Singh; Sardar Lal Singh; The Economic Botanist, Bihar; The Economic Botanist, Orissa; Dr T. S. Sabnis.
- VII. *Additional Members*:—Shri F. B. Loxmeshwar; Shri R. Balasubramania Ayyar; Shri S. S. Pande; Shri G. B. Patel; Mr. M. A. A. Ansari; Prof. R. H. Dastur; Shri-D. L. Sen; Dr. V. G. Panse; Shri P. D. Gadkari; Dr. S. M. Sikka; Dr. S. R. Barooah; Shri S. R. Rane; Pandit Thakurdas Bhargava.
- VIII. *The Secretary, Indian Central Cotton Committee, (ex-officio)*.

TECHNOLOGICAL RESEARCH SUB-COMMITTEE.

The President, Sardar Datar Singh (ex-officio); The Vice-president, Shri R. G. Saraiya (ex-officio); The Agricultural Commissioner with the Government of India (ex-officio) Shri Purshotamdas Thakurdas; Shri Chunilal B. Mehta; Mr. C. P. Bramble; Shri Shankar Lal; Mr. D. N. Mahta; Mr. L. F. H. Goodwin; Shri P. D. Nair; Dr. B. N. Uppal; Shri R. M. Sundaram; Shri Kisanlal Goenka; Mr. A. Mueller; Shri Bhagwandas C. Mehta; Shri Chimanlal B. Parikh; Sardar Lal Singh; Shri R. V. Deshmukh; Shri J. K. Shrivastava; Shri R. Balasubramania Ayyar; Mr. M. A. A. Ansari; Shri P. S. Patil; Dr G M Nabar; The Director of Industries, Bombay; The Principal, Victoria Jubilee Technical Institute, Bombay; Shri S. S. Pande; Dr. V. G. Panse; Shri D. L. Sen (Director, Technological Laboratory); Shri G B Patel; Shri Pratap Bhogilal and Shri B. D. Kulkarni; (Representing the Bombay Millowners' Association), Shri Jeykrishna Harivallavdas and Shri Navnitlal Sakarlal; (Representing the Ahmedabad Millowners' Association), Shri Madanmohan R. Ruia and Shri Jamnadas Ramdas; (Representing the East India Cotton Association) and Dr. L. Thoria (Representative of the Board of Scientific and Industrial Research.)

COTTON FORECAST SUB-COMMITTEE.

The President, Sardar Datar Singh (ex-officio); The Vice-President, Shri R. G. Saraiya; The Agricultural Commissioner with the Government of India (ex-officio); The Director General of Commercial Intelligence and Statistics; Dr. V. K. R. V. Rao; the Director of Agriculture, Bombay State; The Director of Agriculture, Madras State; The Director of Agriculture, Uttar Pradesh; The Director of Agriculture, Madhya Pradesh; The Director of Agriculture, East Punjab; The Economic Advisor and Joint Secretary to the Government of Madras, Public (Economic & Statistics) Department, Madras. Shri Chunilal B. Mehta, Mr. C. P. Bramble, The Director of Land Records, Madhya Pradesh; Mr. D. N. Mahta; Mr. A. Mueller, Dr. V. G. Panse; The Director of Statistics, Hyderabad-Dn, and The Economic and Statistical Adviser to the Government of India.

COTTON GINNING AND PRESSING FACTORIES SUB-COMMITTEE.

The President, Sardar Datar Singh; the Vice-President, Shri R. G. Saraiya (ex-officio); Shri Chunilal B. Mehta, Shri Purshotamdas Thakurdas; Shri Bhagwandas C. Mehta; Mr. A. Mueller; Mr. L. F. H. Goodwin; Shri C. M. Kothari; Shri R. V. Deshmukh Dr. B. N. Uppal; Shri S. S. Pande; Shri Ram Narain Varmani; Sri D. L. Sen; Shri J. K. Shrivastava, and Shri Bhavanji A Khimji

Statement of Receipts and Payments for the year ended 31st March, 1950.

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64th Meeting of the Indian Central Cotton Committee



THIRTIETH
ANNUAL REPORT

INDIAN
CENTRAL COTTON
COMMITTEE

FOR THE YEAR ENDED

31st AUGUST,

1951.

PRICE Rs. 2.

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INDIAN CENTRAL COTTON COMMITTEE

ANNUAL REPORT

CHAPTER I

GENERAL

The Indian Central Cotton Committee was established by the Government of India in 1921, in pursuance of the recommendations of the Indian Cotton Committee of 1917-18, and this is its Thirtieth Annual Report covering the period 1st September, 1950, to 31st August, 1951. During the first two years, the Committee was a purely advisory body to Government on matters connected with cotton. In 1923, however, it was incorporated under the Indian Cotton Cess Act and provided with separate funds to enable it to undertake work for the improvement of the growing, marketing and manufacture of cotton in India. These funds are derived from the levy of a cess on all cottons consumed in mills in India or exported from Indian ports. For the first three years after the passing of the Act, the cess was collected at the rate of annas four on every bale of Indian cotton consumed in Indian mills or exported, and thereafter at the rate of annas two. In the years preceding the World War II, the annual income of the Committee from this source was about Rs. 7/- lakhs.* However, as a result of heavy decline in exports during the War, the receipts from Cotton Cess dropped considerably. The income of the Committee was further reduced by the partition of the country in August, 1947, as a consequence of which the cess on exports of cotton from Pakistan, as also on cotton consumed in Pakistan mills, was lost to the Committee. This loss of income was made good to some extent by grants given by the Government of India from the cotton Fund which had been built from the proceeds of the levy of an additional duty of one anna per lb. on all imports of raw cotton. In order to provide a more assured and adequate income to the Committee to enable it to carry out its work and policy effectively, two successive

* One lakh = one hundred thousands

amendments of the Indian Cotton Cess Act were carried out in 1947 and 1948. By these amendments, the cess was made leviable on all cotton consumed in Indian mills or exported from India, with effect from 15th August, 1947, and the rate of the cess was raised from two annas per bale to four annas per bale from the 10th September, 1948. Further, as from the 1st April, 1951, this amended Act, whose provisions were hitherto applicable to only Part A* and C⁺ States, was applied to the Part B† States as well.

During the thirty years of its existence, the Indian Central Cotton Committee has provided a common meeting ground for all sections of the cotton industry and the Agricultural Departments of the cotton growing States in India, at which the cotton problems of the country have been discussed and measures for dealing with them suggested. In the discharge of its functions, the Committee has always adhered to its original principle, *viz.*, the cotton growers' interests must be paramount in all matters considered by it and that no permanent developments could take place unless they were in his interests.

The first task of the Committee was to initiate a well-directed co-ordinated effort for the improvement of cotton in India from every aspect, including the improvement of the race of the plant by scientific plant breeding. Grants were made to Departments of Agriculture in the various cotton growing States for specific investigations on cotton in which improvement of the variety was naturally given a high priority. It was and is the general policy of the Committee to supplement and not to supplant the work of the State Departments of Agriculture, and though, as a matter of convenience, certain lines of demarcation have been laid down regarding the investigations which the Committee considers most appropriate for its grants, assistance, as a general rule, is given for studies and extension work that are most needed.

-
- * Part A States — Assam, Bihar, Bombay, Madhya Pradesh, Madras, Orissa, Punjab, Uttar Pradesh and West Bengal.
 - + Part B States — Hyderabad, Jammu and Kashmir, Madhya Bharat, Mysore, Pepsu, Rajasthan, Saurashtra and Travancore-Cochin
 - Part C States — Ajmer, Bhopal, Bilaspur, Coorg, Delhi, Himachal Pradesh, Cutch, Manipur, Tripura, Vindhya Pradesh and Andaman and Nicobar Islands.

The Cotton Cess (Amendment) Act of 1948 also provided for the representation on the Committee of some of the newly integrated States in which cotton is an important crop. A list of members of the Committee indicating the various interests they represented, as on the 31st August, 1951, is given in Appendix I. The names of members of the various Sub-Committees are shown in Appendix II. The functions of these Sub-Committees have been described in earlier reports of the Committee. Under the Indian Cotton Cess Rules, members, other than *ex-officio* members; hold office for three years, and one-third of their number retire each year in rotation. The term of office of additional members appointed by the Central Government under Section 4 (x) of the Indian Cotton Cess Act is three years or such shorter period as may be specified in the notification appointing them.

The post of Secretary of the Committee in the year under review was held by Shri Kalidas Sawhney and that of Assistant Secretary by Shri C. J. Bocarro. To cope with the rapidly expanding work of the Committee, a temporary post of Deputy Secretary was created during the year and Dr. R. Sankaran was appointed to it. He took charge of his office on the 2nd December, 1950, and continued to hold the post till the 8th August, 1951, when he was transferred as Director, Institute of Plant Industry, Indore. His place was taken by Shri P. D. Gadkari from the 9th August, 1951.

The total receipts of the Committee from its inception in 1923, to the 31st March, 1951, amounted to Rs. 3,10,60,387/-, of which Rs. 2,31,88,662/- represented collections from the Cotton Cess and miscellaneous receipts and the remainder, special grants from the Government of India. The receipts during the year under report amounted to Rs. 30,16,015/- and the total expenditure to Rs. 14,53,796/-. A statement of receipts and expenditure for the year ending 31st March, 1951, is given in Appendix III.

Sardar Datar Singh (President), Shri R. G. Saraiya (Vice-President), Shri Chunilal B. Mehta, Dr. B. N. Uppal, Shri Chimanlal B. Parikh, Shri P. S. Patil and the Secretary represented the Committee on the Board of Governors of the Institute of Plant

Industry, Indore, during the financial year ending 31st March, 1951. During the same period, Shri Chunilal B. Mehta represented the Committee on the Indian Council of Agricultural Research. Shri Chunilal B. Mehta was also appointed as the Committee's representative on the Administrative Council of the Empire Cotton Growing Corporation for the period ending 31st May, 1952. Under Article 51 of the Articles of Association of the East India Cotton Association, the Indian Central Cotton Committee is entitled to nominate from amongst its growers' representatives, three persons, not having dealings in forward contracts, as Directors of the Association. Shri A. K. D. Balarama Raja, Shri S. R. Rane and Shri P. S. Patil worked in this capacity in the cotton year 1950-51.

Three meetings of the Indian Central Cotton Committee were held in the year under report at which Sardar Datar Singh, President of the Committee and Vice-President of the Indian Council of Agricultural Research, presided. The first meeting was held on the 29th and 30th September, 1950, the second on the 23rd and 24th February, 1951, and the third on the 27th and 28th July, 1951. The first of these three meetings was really the monsoon meeting of the previous year, which could not be held in that year for unavoidable reasons.

At its meeting held in September, 1950, the Committee reviewed the progress made under the cotton extension schemes of the Government of India during 1950-51 season, and passed the following resolution:—

“The Committee is grateful to the Government of India for the effective efforts made by them to increase cotton production in the country, and is glad to note that these efforts are likely to be successful in achieving the target for the year, provided the weather conditions hereafter are satisfactory.

2. The Committee desired to draw the attention of the Government of India that the country is still very far from the goal of increasing production to such an extent as would be sufficient to meet the internal requirements of the-

Textile industry and allow a fair amount of surplus for export.

3. The Committee is glad to know that steps are being taken by the Government of India to prepare an integrated plan for increasing production of food, cotton and jute and urges that the efforts for increasing cotton production should be intensified in areas where soil and climatic conditions are more suitable for the cotton crop and where a given effort is likely to produce much greater increase than elsewhere.

4. The Committee strongly recommends to the Central Government that planning for a further increase of cotton production in India to four million bales in the coming season 1951, should be taken up and finalised as early as possible".

The above resolution was communicated to the Government of India and the target of production of four million bales of cotton in 1951-52 was duly accepted by the Government. Plans for achieving this target were also finalised and put into operation.

In its meeting in February, 1951, the Committee considered the repercussions of Government policy regarding purchase of cotton up-country on the quality of cotton, and of the working of Cotton Control on the problem of mixing and made the following recommendations:—

"1. Short supply of cotton being the crux of the position, the expansion of production to the level of about 40 lakhs bales per annum is absolutely essential.

2. Quality differentials for the different varieties should be revised in the light of the raising of the ceiling price last year by Rs. 150/- per candy and the price of cotton should also be adjusted in the light of the price of other commodities in order to ensure larger production.

3. The areas in which the improved varieties will be grown should be declared protected areas and virtually sealed.

4. The cultivation of other varieties in such areas should be prohibited and all the sowing seed should be supplied by the Government directly or through approved agencies.

5. In order to prevent the payment of a relatively higher price in India for short staple cotton destined for export than for long staple cotton, the export of cotton from India should be controlled either by raising the export duty or, if necessary, the export to be done through Government agency, and export should be allowed only late in the season after the requirements of the local industry have been met.

6. Additional cotton growers' representatives should be appointed to the Cotton Advisory Board of the Textile Commissioner; and

7. Nominees should buy all the cotton offered to them without delay and, if necessary, the number of nominees should be increased for the purpose".

These recommendations were forwarded to the Government of India and State Governments for necessary action.

At the same meeting, the Committee also passed the following resolution recommending greater use of short staple coarse cotton by Indian mills in view of the prevailing shortage of cotton supplies:—

RESOLUTION:—

"Steps should be taken to increase the use of Bengals and spinnable waste in India. The Government of India should take steps to encourage the use of these varieties by encouraging the establishment of waste spinning plants and by giving proper prices for the low counts of yarn so as to encourage the use of this cotton in India".

The Government of India to whom the above resolution was forwarded for necessary action intimated that Bengal *deshi* cotton as well as spinnable soft waste were being used in the country to the maximum extent possible and that the export of short staple cotton was restricted only to such quantity as was surplus to mill requirements, whereas that of soft waste of spinnable value had been banned. It was only waste which could not

be processed in the Indian mills that was permitted to be exported.

The Committee at its meeting in July, 1951, considered a note on the recommendations of the Planning Commission for increasing the production of cotton in India during the years 1951-52 to 1955-56. The following resolution was passed unanimously:—

RESOLUTION :—

“The Indian Central Cotton Committee approves of the modest target of 1.2 million bales fixed by the Planning Commission for an increase in the production of Indian cotton during the next five years. The Committee considers it feasible and desirable to produce at least 4.5 million bales of cotton in India as early as possible and urges that the detailed plans for the achievement of the target should be prepared in consultation with the Committee.

The Central Cotton Committee also agrees that it is of the greatest importance to take steps to maintain an appropriate structure of relative prices as between the main agricultural commodities. It is of the opinion that the return to the cotton grower in the price structure should be such as would ensure his full co-operation in the implementation of the planned increase in the production of cotton.

The Indian Central Cotton Committee is further of the view that the production of cotton and other crops should be stimulated in the tracts best suited for each crop, so as to ensure the highest return to the country as a whole for a given expenditure of resources.

The Committee also recommends that special steps should be taken to grow in India, wherever economically feasible, the varieties of long staple cotton of 1" and over, which are at present being imported at high cost from abroad”.

The resolution was forwarded to the Government of India for necessary action. As a result, the Central Government drew the attention of the various State Governments to the targets of increased production fixed for them by the Planning Commission and asked them to furnish plans for achieving these targets.

Varieties	Acreage	Production (Bales of 392 lbs. lint)
White & Red Northern	115	12
Warangal & Coconadas	71	12
Chinnapathi Short Staple	6	2
Total	<u>2,896</u>	<u>377</u>
TINNEVELLIES		
(including Karungannies)	<u>408</u>	<u>88</u>
CAMBODIAS	<u>264</u>	<u>134</u>
SALEMS	<u>19</u>	<u>3</u>
COMILLAS	<u>47</u>	<u>19</u>
GRAND TOTAL	<u>13,859</u>	<u>2,926</u>

(b)—Less than 500 bales.

The map facing page 10 shows the area and production of different varieties, including principal improved types, for each State of the Indian Union.

(II) STATISTICAL POSITION

Since the partition of the country in 1947, India has become a net-importer of cotton instead of being an exporting country. During the past 4 years, the cotton supply position has been a source of a great anxiety to the country. The position in the year under review was not much different. The year, 1950-51, began with a total carryover of about 17 lakh bales of cotton with mills and the trade. As a result of the special measures taken by the State and Central Governments, the production of cotton in the country in 1950-51 was increased by about 4 lakh bales; on the other hand, the imports of foreign cotton were lower by about 4 lakh bales, as compared with the previous season. With mill consumption and exports in 1950-51 at lower levels than in the preceding year, the closing stock was on balance higher by about one lakh bales than the opening stocks. The statistical position of cotton for the year under review is outlined in the following table:—

	7/8" and above	Below 7/8" and above 1 1/16"	1 1/16" and below	Total
	(In lakhs of bales of 392 lbs. each)			
1. Estimated carry-over at the commencement of the season i.e., on 1st September, 1950				
(a) <i>With mills.</i>				
Indian Cotton	2.0	6.3	0.9	9.2
Foreign Cotton	5.0	—	—	5.0
(b) <i>With trade</i>				
Indian Cotton	0.2	1.3	0.3	1.8
Foreign Cotton	0.7	—	—	0.7
	7.9	7.6	1.2	16.7
2. Production of Indian cotton in 1950-51	6.8	19.4	7.1	33.3
3. Imports from foreign countries ...	8.3	—	—	8.3
Total supply ..	23.0	27.0	8.3	58.3
4. <i>Mill Consumption.</i>				
Indian Cotton	5.8	17.2	2.2	25.2
Foreign Cotton	11.0	—	—	11.0
	16.8	17.2	2.2	36.2
5. Extra factory consumption ..	—	0.4	2.3	2.7
6. Exports	—	—	1.8	1.8
Total offtake ...	16.8	17.6	6.3	40.7
7. Estimated carryover at the end of the season i.e. on 31st August, 1951				
(a) <i>With mills.</i>				
Indian Cotton	3.0	8.4	1.0	12.4
Foreign Cotton	3.0	—	—	3.0
(b) <i>With Trade.</i>				
Indian Cotton	0.2	1.0	1.0	2.2
Foreign Cotton	—	—	—	—
Total ...	6.2	9.4	2.0	17.6

(III) STAPLE LENGTH OF INDIAN COTTON

The classification of Indian cotton according to staple length was revised during 1947-48, in view of the marked changes that had taken place in the character of the crop in the preceding decade. The following staple length groups, as approved by the Committee, were accepted by the Export Trade Controller, Delhi, and the Textile Commissioner, Bombay:—

Superior Long Staple	—1" and above
Long Staple	—7/8" to 31/32"
Superior Medium Staple	—13/16" and 27/32"
Medium Staple	—Below 13/16" and above 11/16"
Short Staple	—11/16" and below.

The revised classification was adopted in the Committee's Statistical Leaflet entitled "Report on the staple length of the Indian cotton crop of the 1946-47 season".

The proportion of the total crop of 2.95 million bales in 1950-51, falling under each of the above five staple length groups was 2,20,27,20, and 31% respectively, as against 1,20,28,23 and 28% respectively, in the previous season.

(IV) DEMAND FOR VARIOUS TYPES OF COTTON IN INDIA

Statistics relating to receipts at mills are collected direct from mills on a voluntary basis and published by the Committee for general information during each season. During the season under review, the total receipts at mills of Indian cotton were 2,699,000 bales of 392 lbs. each. The long, medium and short staple cotton formed 20, 72 and 8 per cent, respectively, of the total receipts. The statistics of receipts of foreign cotton were also collected simultaneously. The figures for the year 1950-51 together with those of previous two seasons are given below:—

Types of foreign cotton	Receipt at mills (1,000 bales of 392 lbs. each)		
	1948-49	1949-50	1950-51
Pakistan Cotton	415	106	36
American (U. S. A. & Others)	80	447	371
Egyptian	432	391	268
East African	224	288	204
Others (Sudan, Afghan, Burma etc.)	62	48	77
Total	1,213	1,280	956

(V) EXPORTS.

Statistics relating to exports of Indian cotton of different varieties are collected annually from the exporters on a voluntary basis. The exports during the season amounted to 175,000 bales.

The quantities exported to the United Kingdom, Continent of Europe, United States of America and other countries formed 16, 12, 41 and 31 per cent, respectively, of the total exports. The corresponding percentages for the previous season were 5, 40, 28 and 27, respectively.

(VI) MILL CONSUMPTION.

Statistics of cotton consumed in mills in Parts A and C States of the Indian Union are collected from mills in those territories under the Indian Cotton Cess Act. The consumption figures for mills in Part B States are collected on a voluntary basis.

The total mill consumption of cotton in 1950-51, as compared with that of the previous two years is shown below:—

STATES	1948-49			1949-50			1950-51		
	Indian cotton	Foreign cotton	Total	Indian cotton	Foreign cotton	Total	Indian cotton	Foreign cotton	Total
	(In thousand bales of 3,32 lbs. each)								
Part A States	2,626	1,038	3,664	1,929	1,086	3,015	1,850	1,083	2,933
Part B States	57	39	566	499	52	551	509	48	557
Part C States	1..	1..	1..	142	22	161	142	17	159
Total Indian Union ..	3,153	1,077	4,230	2,570	1,160	3,730	2,501	1,148	3,649

† Included under Part A States

It may be mentioned that the Indian Cotton Cess Act was made applicable to Part B States as from the 1st April, 1951. As such, these statistics for the whole of the Indian Union would hereafter be obtainable on a compulsory basis.

(VII) STATISTICS OF UNPRESSED OR LOOSE COTTON

Mills situated near cotton growing areas often use considerable quantities of ginned but unpressed cotton. The figures pertaining to consumption of such loose cotton in 1950-51 together

with the corresponding figures for the previous 2 years are given below:—

States	Unpressed (loose) Indian cotton consumed in mills		
	1948-49	1949-50	1950-51
	(In thousand bales of 392 lbs.)		
Part A States	176	211	174
Part B States	49	65	57
Part C States	8	10	12
Total Indian Union	233	286	243

(VIII) STATISTICS OF COTTON PRESSED

During the year under review, 2,569,793 bales of cotton were pressed in the Indian Union against 2,217,634 bales in 1949-50. These statistics are incomplete owing to figures pertaining to Madhya Bharat State not being available. The Cotton Ginning and Pressing Factories Act, 1925, has been made applicable also to Part B States as from 1st April, 1951, and as such it is hoped that these statistics would be more complete in future.

(IX) COTTON CONTROL

Control over prices, movement and distribution of raw cotton together with the zonal scheme for the equitable distribution of Indian cotton to textile mills was continued in 1950-51. In April, 1950, the Indian Central Cotton Committee recommended to the Government of India that in order to secure the achievement of the target of increased production of cotton, ceiling prices of Indian cotton should be revised so that they compared favourably with the price of competing crops like groundnut and those of similar varieties of foreign cotton, which could be imported. In June, 1950, the Government of India, in pursuance of this recommendation, announced that for the 1950-51 cotton crop, the ceiling price of basic cotton would be raised by Rs. 150/- per candy of 784 lbs. in comparison with the corresponding price for 1949-50 crop. A detailed schedule showing the maximum and minimum prices of different varieties and grades was issued by the Textile Commissioner in August, 1950. A few improved

varieties of cotton, mainly of long and medium staple, were, however, kept out of price control so as to give an incentive to their production.

In September, 1950, the Government of India issued the Cotton Control Order, 1950, which continued the provisions of the 1949 Order with the following additions:—

- “(a) Mills are prohibited from covering their cotton requirements in the form of *kapas*, except in the case of those mills which have owned or leased ginning factories prior to September 1, 1950. These may, subject to such conditions as may be prescribed by the Textile Commissioner, be permitted to purchase *kapas* and gin it for their own use.
- (b) Powers have been conferred on the Textile Commissioner to prescribe a time limit beyond which no person can possess *kapas* and also to issue a directive to persons holding *kapas* to get this ginned within the specified time”.

By a further Notification in November, 1950, the Government permitted trading in Ready Contracts and Delivery Contracts, relating to the Indian cotton of the 1950-51 crop. However, there were no official transactions in these contracts during the year under report. Trading in Hedge contracts and also sales to overseas buyers for the purpose of export were, however, specifically excluded from this permission. The Cotton Advisory Board and Regional Committees were set up for the effective implementation of the Cotton Control Order. By still another Notification, Government assumed powers to regulate movement of *kapas* (unginned cotton) in the country. Further, on the recommendation of the Cotton Advisory Board, power was also taken to seal off areas in which cotton prices tended to pierce the ceiling, so that no mill or trader was to be allowed to enter into a normal transaction in raw cotton for sale or purchase except through a nominee of the Textile Commissioner. To ensure sale of cotton within the ceiling prices, certain cotton areas, viz., Ferozepore

district of Punjab, the Bombay State; and Akola, Amraoti and Buldana districts of Madhya Pradesh, were sealed off, and nominees were appointed to purchase cotton for sale to the mills.

In January, 1951, Government of India announced that no particular market would be assigned to any individual nominee, all of them being free to make purchases within the sealed-off areas. The Government also announced that the ceiling prices allowed for cotton would not include the fee of Commission Agents and also the sales tax. Further, to ensure fair price to growers, *ad hoc* Committees were appointed in different markets for determining the price of cotton. On the 9th March, 1951 Government decided to exempt Bengal deshi cotton from price ceilings in respect of contracts of sale for export.

It is of interest to record that despite the various control measures, the bulk of 1950-51, crop was sold at top ceiling rates (rates for the highest grade and staple). With cotton in short supply, it was inevitable that it should be so.

(X) IMPROVEMENT OF COTTON FORECASTS.

The All-India Official Estimates of cotton crop are subjected to a post-mortem examination every year by the Committee with a view to detecting sources of error and suggesting measures to improve their accuracy. The results of such examination are published in the form of a leaflet. The cotton forecasts of the country for the year 1949-50, were subjected to post-mortem examination in the year under review. The actual crop of the season was found to be 2,741,000 bales as against the forecasted crop of 2,165,000 bales, thereby showing that the official forecast was an underestimate by 21%

(XI) SUPPLY OF MONTHLY REPORTS ON INDIAN COTTON TO THE INTERNATIONAL COTTON ADVISORY COMMITTEE.

During the year, the Committee's office supplied as usual monthly reports on Indian cotton to the International Cotton Advisory Committee, Washington, covering stocks held by mills,

imports of Foreign cotton, consumption of cotton in spinning mills, exports of Indian cotton, crop estimates and pressings, cotton prices, inland despatches by rail of cotton piecegoods, and their export, index of wholesale prices and policy of the Government of India affecting raw cotton and cotton manufactures as announced from time to time.

(XII) CROP ESTIMATING SURVEYS ON COTTON.

The random sampling surveys for more accurately estimating the average yield of *kapas* (seed cotton) per acre for the purpose of framing estimates of total production were conducted by the Governments of Madhya Pradesh and Bombay in 1950-51 also. The survey in Madhya Pradesh covered 98.4% of the total cotton area in the State and the final forecast based on the yield data obtained from the survey agreed more or less closely with the actual crop. In Bombay State, 99% of the total area under cotton was covered by these surveys. The results of the crop cutting experiments were utilised, as in the last year, for framing the yield forecasts of cotton for the major districts. For the minor districts, the production figures were based on old figures of normal yields and anna valuation. The total production of raw cotton in the State of Bombay during 1950-51 was estimated at 6.75 lakh bales from the results of the survey, as against the trade estimate of 8.44 lakh bales.

(XIII) THE PRICES AND ARRIVALS OF COTTON IN THE UP-COUNTRY MARKETS.

The Indian Central Cotton Committee at its meeting held in February, 1949, decided that the Committee's office should undertake to collect data of prices and arrivals of cotton in the up-country regulated markets and prepare consolidated weekly summaries of the same. Further, the study of relationship of the up-country prices with those in the Bombay market was also suggested. Accordingly, all regulated market committees were addressed in 1950-51, with a view to collect the required information. Twenty nine weekly statement of prices and arrivals in various up-country markets during the period from 9th December,

1950, to 30th July, 1951, were prepared and circulated to interested organisations.

(XIV) PUBLICATIONS.

The following statistical publications were issued during the year.

1. *Statistical Leaflet No. 1* (Sixteenth issue 1948-49), entitled "Report on the staple length of the Indian Cotton Crop of 1948-49 season".
2. *Statistical Leaflet No. 1* (Seventeenth Issue 1949-50), entitled "Report on the staple length of the Indian Cotton Crop of 1949-50 season".
3. *Statistical Leaflet No. 2* (Sixteenth Issue 1948-49), entitled "Stocks of Indian raw cotton held in the Indian Union by the mills and the trade on the 31st August, 1949".
4. *Statistical Leaflet No. 3* (Sixteenth Issue 1948-49), entitled "Receipts at mills in the Indian Union of raw cotton classified by varieties, 1948-49 season".
5. *Statistical Leaflet No. 3* (Seventeenth Issue 1949-50), entitled "Receipts at mills in the Indian Union of raw cotton classified by varieties, 1949-50 season".
6. *Statistical Leaflet No. 4* (Sixteenth Issue 1948-49), entitled "Exports by sea of Indian raw cotton classified by varieties, 1948-49 season".
7. *Statistical Leaflet No. 4* (Seventeenth issue 1949-50), entitled "Exports by sea of Indian raw cotton classified by varieties 1949-50 season".
8. *Statistical Leaflet No. 5* (Eighth issue 1946-47), entitled "Report on the accuracy of the All India Cotton Forecast of 1946-47 season".
9. *Statistical Leaflet No. 5* (Ninth issue 1947-48), entitled "Report on the accuracy of the All India Cotton Forecast of 1947-48 season".

THE VISIT OF THE HONBLE MINISTER FOR FOOD AND AGRICULTURE, GOVERNMENT OF INDIA
NEW DELHI, TO THE TECHNOLOGICAL LABORATORY, MATUNGA.



1. Honble Mr. K. M. Munshi.
2. Dr. C. N. Srinivasan, Director, Technological Laboratory, Matunga.
3. Mr. K. A. S. Srinivasan, Secretary, Indian Central Cotton Committee, Bombay.

CHAPTER III.

RESEARCH

Most of the research work financed by the Committee is concerned with the improvement of the yield of cotton plant and the quality of its produce, the primary objective being to enable the cotton grower to secure the maximum cash return per acre. Schemes are also in operation for the production of disease-resistant varieties suitable for cultivation in different cotton tracts. Research on cotton technology and the physiology of the cotton plant also received due attention. A majority of the research schemes are financed entirely by the Committee; the cost of the remaining few being shared by the Committee and the State Governments concerned. During the past eight years, the Government of India have made large grants from its Cotton Fund to meet the expenditure on the research and extension work.

TECHNOLOGICAL RESEARCH.

As usual, the Committee's Technological Laboratory continued to render valuable service to the Cotton Breeders in the evolution and the spinning properties of the new varieties produced by them. The textile trade and the industry also took full advantage of the facilities available at the Test House of the Laboratory. During the year under review, the total number of samples received for various types of tests were, 1,848 as against 1,337 last year and the number of reports issued was 569 as compared with 365 in the previous season.

Amongst the different varieties tested at the Laboratory, it was found that Giza 12 grown in Mysore State had a staple length of $1\frac{1}{8}$ " and was suitable for spinning up to 65s warp counts. In a mill test, on a composite sample of Sea-Island cotton grown in different localities in the west coast district of Madras State, the staple was found to be highly irregular. Spinning tests were also continued on standard cottons grown in the Experimental Stations in the principal cotton growing tracts and on trade varieties, which are of a fair average quality and are

normally handled by the trade and the industry. The results of this test were published in the Technological 'ulletins, as usual.

Good progress was made with the technological investigations under way at the Laboratory. The research on problems connected with the ginning of cotton was completed and a consolidated report on the pre-cleaning and ginning tests on 17 varieties of Indian cotton was published. The report described the efficiency of pre-cleaning machines, comparison of different gins, effects of different speeds and rates of feed in the saw gin, effects of overlap and different speeds in roller gins etc. It was found that the trade was reluctant to pay a proper premium either for cotton ginned after pre-cleaning or for lint cleaned in Crighton Opener after ginning, showing thereby that neither pre-cleaning nor Crighton opening of ginned cotton before baling in upcountry centres was an economic procedure. However, it would seem that cotton mill, receiving supply from its own ginning factory, would benefit materially if it baled lint after cleaning it with a Crighton Opener. It would save freight charges paid for carrying trash and dirt from the ginning factory to the place where the mill is situated.

The work on the strength of attachment of fibres to the seed-coat showed that the strength of attachment was much greater at the micropylar than at the chalazal and right and left regions of the seed surface. Further the strength of the attachment was found to differ in varieties belonging to different botanical species.

In the investigation on the effects of storage of commercial bales on the quality of lint of the varieties Co.2, Jarila and Parbhani American 124F, it was found that there was practically little or no sign of deterioration in respect of yarn strength even when bales were stored for four years but the lint was somewhat discoloured. The results of this investigation were published in a bulletin of the Laboratory.

Comparative test on draw frame, *viz.*, with 6 ends up with a draft of approximately 6 and 8 ends up with a draft of approximately 8, were made and it was found that the former treatment gave stronger yarns than the latter.

The apparatus meant for measuring air permeability of textile fabric was suitably modified for use in the rapid measurement of fineness of cotton fibre. Large number of tests carried out with this apparatus showed that this could be successfully used for measuring this property and a paper relating to this work was published in the year under review.

A good deal of work was also done for improving the various formulae previously developed for the prediction of spinning values of different cottons from their fibre property.

Finally, mention may be made of a few investigations carried out by the Technological Assistants posted at the Cotton Breeding Stations in the various States. In a manurial experiment at Abohar in Punjab, it was observed that the application of 50 and 100 lbs. of nitrogen, either in the form of groundnut cake or Ammonium Phosphate, had practically no effect on the mean length weight per inch and maturity of cotton fibre. In an investigation at Coimbatore in Madras, it was found that if the sowing date of the crop was delayed beyond 5th October, i. e., by a month after the normal sowing date, the fibre characters deteriorated perceptibly.

A preliminary study of the variation in mean fibre length of Suyog and Vijay varieties, when grown in different localities, was conducted at Surat in the State of Bombay. Results showed that the staple length of Suyog varied from 0.90" to 1.01" and that of Vijay from 0.85" to 0.95".

The Technological Assistant at Dharwar designed a new device for determining the ginning percentage quickly. Tests on 10 gm., 20gm. and 30 gm. samples showed that this device was capable of giving values which were nearly as accurate as those obtained by the ordinary method, whereas the time taken was much less.

A FUNDAMENTAL RESEARCH WORK ON COTTON.

The fundamental research work on cotton is conducted largely at the Institute of Plant Industry, Indore and that on inter-specific hybridisation is carried out chiefly at Surat in the

State of Bombay. The work done during the year under review is described in the following paragraphs :-

1. Genetics.

(i) **Lintlessness** :- 55 F_1 progenies, involving various lintless genes, were grown to study the inter-relationships of the lintless genes and their linkage. The data collected showed that the Banilla lintless (a hairy lintless mutant observed in Banilla cultures at Indore) was due to a new independent gene l_a which was complementary for lint production to l_a , l_b , l_d , and l_e . Further a new hairy lintless mutant was observed at Khargone and taken up for study.

(ii) **Fuzz colour** :- Progenies breeding true to different grades of green and white fuzz were studied for mean halo length and mean ginning percentage during the year. The following observations were recorded.

	Fuzz Colour	Mean halo length m. m.	Mean ginning percentage
Buri 107	Green	18.90	21.7
	White	17.20	23.5
Bazar material Upland	Green	18.70	28.6
	White	21.20	23.8

These results confirmed the previous two seasons' finding that in the case of Upland variety the green fuzzed types give a higher ginning percentage than those with white fuzz.

(iii) **Jassid resistance** :- The progenies grown from jassid-free and jassid susceptible plants of Indore 2, Buri 107 and M.U.4 bred remarkably true for their respective characteristics. However, it was not found possible to study the association of the lint characters with jassid resistance since the susceptible progenies failed to give any produce.

(iv) **Chlorophyll deficiency** :- Studies on three deficient mutant types, viz., (1) chlorophyll deficient bred from naturally occurring chimeras, (2) virescent mutant in Tellapathi and (3) light green in Jarila were continued. All the three deficient types were found to be simple recessives, normal green being fully dominant. All these genes were also found to be independent of one another.

(v) **Interspecific hybridisation:-** The object of the work continued at Surat is to cross Asiatic and American varieties and obtain fully fertile types possessing the desirable characters of both, particularly the good staple length of the American and the hardiness of the Asiatic varieties. In the year under review a large scale trial on eight new types, derived from American Asiatic crosses, against Suyog and Co.2 showed that three of the new types, *viz.*, B. C. 68, 170-Co.2 and 120-Co.2-18 gave as high yield of *kapas* as Suyog and possessed a staple over 1" in length. Another strain, 125-Co. 2-B. 18 was found to be resistant to black arm and red leaf blight under conditions obtaining at Dharwar in Karnatak. A beginning was also made for the exploitation of hybrid vigour in cotton.

F1 seed of a cross between the *hirsutum* variety Co. 2 and the Barbados type Sea Island was planted on a small scale. The crop was rogued and suitably manured. The produce harvested gave a calculated yield of 1,600 lbs. of seed cotton per acre. The lint was found suitable for spinning 70 to 80s standard warp counts. 15 lbs. of fresh hybrid seed was also produced at a cost of Rs. 25/- per lb. and was distributed for sowing in the following season.

2. Physiology

The cotton physiological research work had continued at Indore. The aim of this work is to obtain, as far as possible, a precise knowledge of the relationship between the soil, climatic and agronomic factors and the plant growth and production of different varieties.

(i) **Effect of trace elements:-** An investigation on the effect of trace elements on the growth and yield of American cotton showed a significant increase in the yield of *kapas* (seed cotton) in plots treated with Manganese, Copper and Chromium. The increased yield obtained with the application of Boron did not reach the level of statistical significance. The results further confirmed the last year's finding that higher doses of these elements were not necessary and that a single dose was as good as a double dose

except in the case of boron with which a single dose of 5 lbs. was found to be too low to give the adequate increase of yield. Analysis of plant leaves collected from the plots treated with different trace elements showed no difference in their nitrogen contents.

(ii) **Studies on the effect of hormones:-** The following indications were recorded in this investigation:-

(a) The application of *Tri-iodobenzoic acid* made the plants bushy by shortening the internodal lengths and also increased the number of flowers produced.

(b) *2,4 Dichloro orthophenoxyacetic acid* stimulated the plant growth as well as flower production but produced no increase in yield. The effect was found to be more marked on the *desi* variety than on the American Upland.

(c) *β -Naphthalene-acetic acid* and *β -Indolylbutyric acid* increased the setting percentage of flowers and thus enhanced the yield of *kapas*. A beneficial effect was shown by both American and *desi* varieties.

(d) *Planofix* sprayed in a suitable concentration on the crop of American cotton lessened shedding and produced a greater number of bolls and higher yield of *kapas*. Similar treatment given to *desi* cotton did not produce much response.

(e) The treatment of sowing seed with *Seradix B* or *Planofix* showed that there was no favourable response in case of *desi* cotton. In fact, the higher doses of both the hormones reduced the plant stand and yield of *kapas*. In the case of American cotton, it was found that while *Seradix B* increased the yield of *kapas*, *Planofix* produced no beneficial effects, its higher concentration affecting the crop in a definitely adverse manner.

(iii) **Investigations on the red leaf disease in American Upland cottons:-** The Dharwar-American varieties Gadag 1 and Laxm and the Malwa American variety, Indore 1 were grown in a replicated trial at Indore. It was found that all the varieties

suffered from red leaf typical of Malwa. The redening increased progressively with the advance of the season. Indore 1 suffered more than Laxmi. It was also found that the application of Ammonium Sulphate hastened the maturity of the crop by reducing symptoms of red leaf. On the other hand, the deep rooting of plants lessened the incidence of red leaf. It thus appears that in Malwa the depletion of food materials from leaves produced red leaf, whereas in Karnatak the same *phenomena* is brought about by the desicating action of strong ones that prevail in that part of the country in November and December. It has also been noted that the formation of anthocyanin substance takes place when the night temperature fall below 70°. This occurs in October in Malwa and in January in Karnatak.

(iv) Study of crop weather relations :- A special scheme was started in 1947 for the study of the effects of climatic factors on plant growth, crop yield and the incidence of pests and diseases. The work of the scheme was continued in the year under review and full meteorological and crop growth data were collected at Surat-Jalgaon, Nagpur, Parbhani, Koilpatti and Coimbatore. This is a long range investigation which will have to be continued for a number of years. It may be mentioned, however, that in the year under review the crop at Surat had to be re-sown due to untimely rains. Furthermore, in Gujarat and parts of Madras the crop suffered from deficiency of rainfall. In the Madhya Pradesh, rainfall was adequate for the vegetative phase of the cotton plant and no untimely heavy rains occurred at the time of flowering or boll formation.

(v) Possibility of growing American cotton under rainfed conditions in Mewar tract :- Sowing date, spacings and manurial experiments with American variety Indore 1 and the local *desi* type were conducted at Bhilwara, Kapasin and Horda in Mewar. The results confirmed that American cotton, when grown under rainfed conditions, gave as high yield as the local *desi* variety commonly grown in these three districts. Manuring with Ammonium Sulphate gave a very small and uneconomic increase in yield.

In another experiment, it was found that post-monsoon irrigations did not produce any beneficial effect on yield. On the other hand, the crop sown under irrigation before the setting in of the monsoon, gave a very much higher yield than the rain-sown crop.

III. AGRONOMY.

(1) **Soaking of seed in nutrient solutions :-** This investigation is being conducted at the Institute of Plant Industry, Indore. Its object was to study the effect of soaking cotton seed in nutrient solutions before sowing on the ultimate yield of the crop. The trial was carried out with one *desi* and one American variety viz., Bhoj and Indore 1. The treatments included in the experiment were soaking of the seed in one molar solution of (1) Ammonium Sulphate, (2) Ammonium Phosphate, (3) Mono-potassium phosphate, (4) pure water for 24 hours before sowing and (5) control (unsoaked seed). Due to the effect of different nutrients on the viability of the seed, the seed rate was adjusted according to germination percentage of the seed soaked in different solutions. The results obtained were as follows :—

	Seed soaked in				
	Mono-Pot. phosphate.	Amm sulphate	Amm. phosphate.	Water.	Dry.
Bhoj	377	372	371	393	3·8
American (Indore 1) ...	228	215	2 07	159	159

Significant Difference 51.7

It is stated that for the first time, since the experiment was started, the *desi* cotton failed to show any response to the various treatments. On the other hand, in the case of American variety, the seed soaked in nutrient solutions gave a higher yield than seed soaked in water or seed sown without soaking, the difference in the case of 2 of the 3 nutrient solutions being statistically significant.

(ii) **Effect of different leguminous crops on the yield of cotton grown after them :-** This investigation also was conducted at the Institute of Plant Industry, Indore. Bhoj cotton was grown after soyabean, groundnut, cowpea, gram, tur, sann and jowar, the last being treated as controlled treatment. All the crops preceding cotton had been manured with superphosphate at the rate of 30 lb. P_2O_5 per acre. The cotton plots were divided into two halves and one half of each plot was manured with groundnut cake at the rate of 30 lb. nitrogen per acre. The average yields obtained from different treatments were as follows :—

	Soyabean.	Ground- nut	Cowpea	Gram.	Tur	Sann.	Jowar.	Sig. Diff.
Yield of kaps lbs. per acre	976	811	794	730	724	722	523	140

Cotton following a crop of jowar gave the lowest yield. All the leguminous crops increased the yield of cotton and the increase was significant. Amongst the legumes, cotton after Soyabean gave the highest yield and the increase in yield was significant compared to cotton after other legumes. As in the previous year, the crops of Soyabean, groundnut and cowpea, which were the earliest to be harvested had a greater beneficial effect than the later maturing legumes. It was also found that unlike last year, the application of phosphate to previous leguminous crops did not show any increase in the yield of cotton, whereas the application of nitrogen to cotton directly increased its yield significantly.

(iii) **Intercropping of groundnut with cotton :-** An experiment was conducted at the Institute of Plant Industry, Indore, to study the results of inter-cropping groundnut with cotton. Two rows of cotton were planted after every 6, 14 and 22 rows of groundnut. The results of the trial are tabulated on the next page :—

Variety.	Yield per acre			
	Control pure groundnut.	Groundnut and cotton 6:2	Groundnut and cotton 14:2	Groundnut and cotton 22:2
Groundnut Ak. 12-24 Dry nuts, md.	8.8	7.8	8.3	9.7
Cotton Malvi Bhoj, Kapas, 1b. (average of 2 fields 5 N and 27 S)	—	57	13	8
Groundnut Ak. 8-11 Dry nuts, md.	7.5	5.5	6.0	7.7
Cotton Malvi Bhoj (average of 2 fields 33 and 34)	—	22	13	11

It would be observed that the growing of 2 rows of cotton after every 6 rows of groundnut reduced the yield of groundnut by 12 to 25 per cent. More or less similar results were obtained in another experiment conducted at Khargone in the Nimar district of Madhya Pradesh.

(iv) **Optimum sowing period for Dharwar-American cotton in Karnatak:-** The sowing date experiment conducted in the previous year was repeated at Gadag in the year under review. The mean yields obtained from the different sowing dates were as follows:—

Yield of kapas in lbs. per acre for crops sown on

Yield	<u>25th August</u> 5.29	<u>9th September</u> 4.81	<u>24th September</u> 3.28
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These results taken together with those obtained last year indicate that in Gadag area, the work of sowing of American crop should be finished before the 15th September as far as possible.

(v) **Long term rotational and manurial trial:-** This experiment was started at the Institute of Plant Industry, Indore, in 1947-48 with the following two rotations:—

- (a) 3 acres rotation consisting of jowar, cotton and wheat, and
- (b) 4 acres rotation comprising of jowar, groundnut, cotton and wheat.

The first cycle of the second rotation was completed in the year under review. The results obtained again showed that the yield of cotton, when grown after groundnut, was very much higher than that of cotton grown after jowar. It was also observed that the two manures Ammonium Sulphate and groundnut cake did not leave any residual effect for the benefit of the following cotton crop. Farmyard manure, however, did have residual effect on the yield of cotton.

IV. STATISTICS.

The work on statistics is being done at the Institute of Plant Industry, Indore, the details of which are as follows:—

(i) **Field technique:**— It had been found from the earlier investigations carried out on the various factors affecting the efficiency of incomplete block designs that the difference between the intra-class correlation coefficients for large and small blocks, small block efficiency, plot size and replicate size were the chief factors that affected the efficiency as these accounted for 90–98% of the variation. In order to find results which will be of direct use to the experimenter, the study was confined this year to other factors *viz.*, the size and shape of plots, blocks and replicated. The coefficient of variation of plots was used to give an idea of the inherent heterogeneity of the experimental field. The data on the double lattice design, for which the largest number of experiments was available, were used. The following simple correlations were obtained between the individual factors on one hand and efficiency (actually the ratio w/w' of the intra and inter-block error of which efficiency is a function) on the other.

Factor	Correlation coefficient with w/w' .
Plot size	0.36**
Plot shape (ratio of length to breadth)	0.32**
Incomplete block shape	0.18
Replicate shape	-0.11
Coefficient of variation	0.11

The joint correlation of these factors with efficiency was only 0.48 and among individual factors plot size and shape alone showed significant coefficients. While, therefore, larger and longer and narrower plots would give a higher efficiency of the incomplete block layouts, the conclusion is that the above factors leave the major portion of the variation in the efficiency of these designs unexplained.

In addition to the above result, two important general conclusions derived from the present investigation on incomplete block designs are given below:—

(i) For progeny row trials, with their small plot size, these designs are not suitable as they are generally not more efficient than the simpler randomised block layouts. It is only when the plot size is about 50 sq. ft. or larger that the designs have shown greater efficiency which is of the order of 110 to 150 per cent.

(ii) Among the three incomplete block designs, *viz.*, double, treble and balanced lattices, there is not much difference in efficiency when interblock information is recovered in the analysis of the data.

(ii) **Statistical study of genetics of quantitative characters - Genetic variability and response to selection:-** Selection in each generation for extreme values of halo-length and ginning percentage in six sets of *arborescens* crosses has been in progress at Indore for the last 9 years. During the year under review, such selections were done in F10 stage. The results obtained during the year showed that, for the first time, the high lines did not indicate any further progress as a result of selection, but actually registered a slight fall in their mean halo-length, though low lines, on the other hand, showed a reduction in halo-length contrary to their tendency during the past three or four years to give an increased length.

Examination of ginning percentage and yield of seed cotton has shown the important result that progenies selected for high halo-length also give a higher yield of seed cotton, but a lower-ginning percentage than progenies selected for low halo-length.

B. APPLIED RESEARCH.

Applied Research is necessarily conducted in the respective tracts. Besides the agronomic experiments already described, applied research consists mainly of crop improvement work. The plant breeding work done in the different States is described briefly in the following paragraphs:—

PLANT BREEDING.

(Breeding of improved varieties)

BOMBAY.

(1) **Scheme for Cotton Breeding in Khandesh:**— This scheme was started in April, 1948. Its objective is (a) to test extensively the strain 197-3 in the districts and (b) to improve its staple by crossing with other long staple varieties.

During the year under review, 197-3 was tested against Jarila at different places and the results showed that at no one place it was significantly different from Jarila in respect of *kapas* yield. It, however, possessed a little higher ginning percentage and fibre length than Jarila but in spinning performance was slightly inferior. A large number of secondary selections from 197-3, Jarila, synthetic hybrid material involving crosses between Dokras and *neglectum roseum* and wilt-resistant strains were tested in progeny row trials at the Government Farm, Jalgaon, and a few of them were found promising from the point of view of yield. Similarly, F_1 's of crosses of 197-3 with superior long staple Madras *arboreums* were grown at Jalgaon for further study.

(2) **Scheme for breeding wilt-resistant cottons in Surat area:**— This scheme was started in April, 1947, at Surat. Its present object is to evolve a cotton which would combine yield and ginning outturn of Suyog with the staple quality of 1027 A. L. F. It should also be early maturing and completely resistant to wilt. Testing of material for wilt resistance was done at Shera and Poona.

During the year under report, the study of the progenies of three wilt resistant strains, *viz.*, 2266, 3652 and 2087 was conducted in highly wilt-infected fields at Shera and in pot cultures at Poona. The results showed that 3 progenies from 2266, 4 from 3652 and 2 from 2087 were promising, in all respects, and deserved to be studied further.

With a view to combine superior staple qualities with the wilt resistance of 3652, it had been crossed with 1027 A. L. F. and 1802. A number of F_3 progenies derived from this cross were found to be promising.

The performance of the three wilt resistant strains mentioned above was again tested against Suyog on cultivators' fields at Shera and at representative place in the Surat cotton tract ; 2087 was again found to be the highest yielder amongst them. It was also found to possess a longer staple and better spinning value than Suyog, but slightly lower in ginning percentage.

(3) Broach Cotton Breeding Scheme :- The Cotton Breeding Scheme at Broach has been in operation since April, 1932. Its aim is to obtain either by selection or hybridisation a type of cotton which would mature earlier than Vijay but would be at least equal to it in yield, ginning outturn and spinning quality. It should also be resistant to *fusarium* wilt.

During the year under review, seven new strains, were tested in district trials carried out at Broach, Dabhoi, Jambusar and Kapadwanj against 1027 A. L. F. and Vijay. The results again confirmed the superiority of 97-41 over Vijay. Although 98-41 was the earliest maturing strain at Broach and Jambusar, it was surpassed in this respect at Dabhoi and Kapadwanj by another strain, viz., E. 22.

Fortytwo progenies obtained from selections in synthetic breeding material produced at the station, were tested simultaneously at Poona for wilt resistance and at Broach for yield performance and fibre characters. Six of these were found promising.

The spinning tests conducted on the samples of last year's crop showed that 98-41 was fit for spinning yarn of 43 Standard Warp Counts as against 39's of Vijay.

(4) Scheme for improvement of Wagad cotton at Viramgam, Jagudan and Bavla :- This scheme was sanctioned in August, 1935, to carry out intensive work for the improvement of Wagad cottons, by introduction of an early maturing habit and staple fineness in them.

This was sought to be achieved by obtaining the Iranian *herbaceum* for hybridisation work. An officer was specially deputed to get the required seed from Iran. The work of this scheme has during the past 15 years produced an improved strain 'Kalyan', which is superior to local Wagad practically in all respects. The present object of the scheme is (a) to test the suitability of Kalyan over the whole Wagad tract and (b) to evolve a strain which while maintaining lint characters of Kalyan would be superior to it in yield of *kapas* per acre and early maturity.

During the year under report, large scale trials of Kalyan, Wagotar and local Wagad at Viramgam and Bavla, showed that Kalyan while maintaining parity with local Wagad in the matter of yield was superior to it in respect of staple length and ginning percentage. It was also superior to Wagotar in staple length and yield.

The study of the performance of promising cultures at Viramgam confirmed the previous finding that cultures 279 and 280 were likely to prove superior to Kalyan in yield and ginning percentage.

Ten new crosses were made to introduce fineness, earliness and staple length of Dharwar or Broach *herbaceums* in Kalyan cotton.

(5) Scheme for improvement of Mathio cotton :- The object of this scheme is to produce a strain which would be an improvement on Mathio Mixture in respect of yield, ginning percentage and quality of staple. The work of this scheme was started in June, 1937, at Amreli and the improved variety Pratap was evolved as a result of it.

During the year under review, large scale trials of Pratap were conducted against local Mathio at Amreli and it was found that although Pratap spun and ginned better than Mathio, its yields of *kapas* and lint per acre were lower than those of the unimproved variety. The lower yield of Pratap was ascribed to the abnormally droughty conditions of the year which local Mathio could stand better than Pratap.

Out of 143 selections from crosses and back crosses of Pratap with Coimbatore *arboreums* showed that 48 progenies were promising.

(6) Scheme for improvement of Dharwar-American cotton :- This scheme was sanctioned by the Committee in July, 1941, with a view to improve the Dharwar-American cotton crop grown in the Kannada districts of the Bombay State and the adjoining areas of the States of Madras, Hyderabad and Mysore. The object was sought to be achieved by the production of an early maturing type of cotton superior to Gadag 1 in respect of yield, staple length, ginning percentage and resistance to red leaf blight. As a result of the work done in the last 7 years, a strain of improved variety called 'Laxmi' was evolved, which is superior to Gadag 1 in almost all respects.

During the year under review, the superiority of Laxmi over Gadag 1 was further confirmed. The new variety yielded 45.3% kapas more than Gadag 1, and also showed resistance to red-leaf blight.

A review of its performance in the last 8 years in the breeders' plot at Gadag and on the cultivators' fields in the district showed that Laxmi was superior to Gadag 1 by 15% in yield of kapas and 3.3 per cent in ginning outturn, thus giving 30 per cent more lint yield per acre. Its mean staple length is 0.94" against 0.83" of Gadag 1. It also spins 42's as against 33's of the latter. In addition, Laxmi is earlier to mature and more resistant to red-leaf blight.

Further work conducted under the scheme is designed to produce a type still better than Laxmi. In the year under report, a trial was carried out with six long staple, Madras-American strains, 3 exotic varieties and 6 types developed from Surat inter-specific hybrid material. The results of the trial showed that none of them is equal in yield to Laxmi. It was, however, noted that three cultures from Surat, viz., 134, Co. 2M, B. C. 68-22 and (134 x Co. 2) M x G. S. M. were promising.

Further, a large number of promising cultures from the advanced synthetic hybrid material involving Co. 2, Co. 3, Co. 4

and Perso-American, Kampala, Jinja, M. 4 and Laxmi etc. as parents were studied in the year.

PUNJAB.

(1) Scheme for improvement of cotton of south-eastern districts of Punjab :- This scheme, which is an off-shoot of the Punjab Botanical Scheme, was started at Hansi in March, 1945. The object of the scheme was to replace the *desi* cotton by high quality American cottons in the irrigated portions of the tract without, however, losing sight of the desirability of breeding improved *desi* types which would continue to be grown in such parts of the tract as are not suitable for the cultivation of American Cotton.

During the year under report, the work on cotton consisted of testing of (a) 13 substrains and a large number of progenies representing reselections in 216F (b) four substrains and a large number of progenies developed from the crosses of Punjab American strains with the variety " Wild " of United States and (c) four progenies of the cross between Punjab 45F and LSS. In addition, the progenies of backcrosses between Punjab American and *desi* were also studied.

With regard to the work on *desi* cottons, the new variety 231 Rosea was again found superior to Mollisoni M. 60 A2. A large number of selections from the crosses between Mollisoni M. 60A2 other superior quality *arboreums* was also studied.

(2) Scheme for breeding long staple cotton in Punjab :- The work of this scheme was commenced at Abobar in April, 1949, with the object of breeding American varieties of cotton, possessing a staple length of one inch and above, suitable for cultivation in the Punjab. During the year under report, out of a total of 194 progenies selected from crosses between different Punjab-American varieties, seventy were found to possess a staple length of an inch and above. The yield and ginning percentage of some of these long linted progenies was also very satisfactory. Further, forty-eight progenies derived from the crosses between Punjab-American types and long linted varieties of Madras were studied. A large majority of these had halo-length of 27-28 m. m. and a few 29 m.m. or more. Similarly, a few progenies of crosses between Punjab American varieties, on the one hand, and Giza and Ashmouni

cottons of Egypt and Bar 4/15 variety of Sudan, on the other, showed a staple length of 32.8 m. m. but all of them have still to be stabilised.

(3) Scheme for breeding American cotton suitable for introduction in sub-montane district of Punjab :- This scheme was put into operation at Jullundur in October, 1948. with the object of evolving American types of cotton capable of replacing the short stapled *desi* variety at present grown in the sub-montane tract of East Punjab.

During the year under review, varietal trials with seven American strains and local *desi* varieties showed that all the American varieties yielded significantly better. Further, 102 single plant selections from various Punjab-American strains and their crosses were tested in replicated progeny rows. On account of its consistently good performance, the variety 320F was introduced for general cultivation in the tract.

In an agronomic experiment conducted in different localities with 320F variety of cotton it was found that on fertile soil a remunerative crop of irrigated wheat could be grown as a second crop after cotton in the same year. On less fertile soils, the application of Ammonium Sulphate at the rate of 25 lbs of nitrogen per acre was essential for the successful growing of the second crop. This is a valuable finding, which, if put into practice on a large scale, would materially enhance the income of the farmer on the one hand and increase food production without curtailing the area under cotton on the other.

MADRAS

(1) Scheme for improvement of Mungari cotton :- This scheme was started in 1937 to evolve a strain of cotton which would possess the good staple qualities of Westerns and be suitable for cultivation in the Kharif season in place of the short staple Mungari cotton in general cultivation on the red soils of Bellary. Anantapur and Kurnool districts. The new variety of cotton 881F produced under this scheme was multiplied on 359 acres in the year under report.

The work of breeding a strain superior to 881F was continued at Adoni and 46 selections in an advanced stage of develop-

ment were tested, against 881F and local Mungari. Of these, 15 were found to be promising. A preliminary yield trial of 83 selections in replicated progeny rows was also carried out. It showed that performance of four progenies was encouraging. Furthermore, 449F₁ and 56 F₂ progenies of crosses between good quality Madras *arboreums* and the early maturing Khandesh type 197-3 were studied.

(2) Scheme for improvement of Cocanadas cotton in Madras State : The work of this scheme was commenced in 1938, with the object of improving the yield and ginning percentage of Cocanadas cotton without losing the light pinkish colour of its lint for which this variety is usually valued.

During the year under review, four cultures whose fibre characters were similar to those of 336B, were tested at Narasaraopet and Lam, and it was found that the new strain RH. 25 was as good as 336B. Further, a study of 20 families developed from hybrids of 336B with Manipur Khaki and other varieties showed that the performance of 336D. 5-5 was encouraging.

(3) Scheme for breeding Cambodia cotton in ceded districts :- This scheme was put into operation in April, 1945, in order (a) to produce a long staple American variety capable of giving good yield when grown as an irrigated *rabi* crop, and (b) to find a good quality exotic type suitable for cultivation in lands not served by the Tungabhadra irrigation project. The work of the scheme is conducted at three centres *viz.*, Siruguppa - irrigated black soil, Hagari - unirrigated black soil subject to precarious and low rainfall and Nandyal - unirrigated black soil, receiving a relatively heavy rainfall.

During the year under report, a trial of 14 prolific American types, including Surat and Latur American strains showed that the strain (G1 x Co2) -9-3 was significantly superior to the rest in yield. In another replicated trial of strains developed from Hyderabad, Mysore and Madras American varieties, three strains, *viz.*, 2705-1 (M.A. 2), 2677-3 (H. A. 11) and 3036 were found promising. A study of Egyptian varieties both in 'Kharif' and 'Rabi' season was also conducted, but these varieties suffered badly from red-leaf, black arm and flower and boll-shedding.

The trials with unirrigated cotton at Nandyal and Hagari did not give any conclusive results owing to practical failure of north-east monsoon at both the places. However, it may be mentioned that out of eleven strains of American cotton tested against the improved *deshi* variety H. 1 at Hagari, three, viz., 2196-4, 6094-C. XVI and 320 were found equal to H. 1 in yield. In a similar experiment with 14 American strains at Nandyal, the strain 320 only equalled the Control Variety N. 14 in yield. All these strains were longer in staple than the respective 'controls' at both the centres.

Yield trials with the varieties M. A. 2, Laxmi, Madras-Uganda 1, H. A. 11, II-42-8079 and the local were conducted at 9 centres in different districts. The crop failed due to severe drought at two centres. At one centre, in Anantapur district, Madras-Uganda 1 gave an yield of 12.15 maunds of kapas per acre under irrigated conditions. Laxmi fared well in parts of Bellary and Cuddapah districts and it is reported that this variety is gaining rapid popularity with the cultivators on account of its high yield and superior quality fibre.

(4) **Scheme for improvement of Westerns cotton in Madras State :-** This scheme started functioning in June, 1949, at Hagari. Its objective is to evolve an early maturing wilt-resistant Westerns cotton having a staple length of 13/16" or over and a ginning out-turn of at least 33 per cent. It should also be less wasty in the process of spinning.

During the year under review, seven selections were tested for their yield performance against H.1 at Bellary, Gooty, Adoni and Hagari and it was found that the performance of two *herbaceum* strains viz., 4136-5 and 3770-IV/1-1-3 was promising. In another trial with nineteen hybrid families conducted at Hagari, four families viz., 4272, 4327, 4331 and 4333 proved superior to H. 1 in yield and ginning outturn.

(5) **Scheme for improvement of White Northerns cotton:-** This scheme was started in June, 1949, with the object of evolving a strain of cotton which would have the staple length and fineness of N. 14, ginning percentage of at least 33 and would be suitable for growth under the soil and climatic conditions of the Northern tract.

During the year under report, four hybrid strains were tested for their yield against N. 14 on cultivators' holdings and strain 5001 was found to be the most promising. In another trial consisting of 12 strains, the selection 6234 (which is derived from a cross between N. 14 and 1523) gave a significantly better yield than N. 14 and had a ginning percentage of 35 with staple qualities as good as those of N. 14. Further, three new cultures, *viz.*, 6186, 7057 and 6199 gave significantly better yield than N. 14 in compact family blocks.

(6) **Scheme for improvement of Tinneveli and Karunganni cottons:-** This scheme was put into operation in June, 1949, for the purpose of producing improved *desi* varieties capable of spinning upto 40's warp counts and suited for cultivation in the entire unirrigated Karunganni area in the Central and Southern districts of Madras State.

The existing Karunganni strains K. 2 and K. 5, grown in the Southern and Central districts, respectively, need to be improved in respect of fibre fineness and ginning outturn. In addition, it is considered desirable that the required new strain should be suitable for cultivation in the entire Karunganni area.

In the year under review, bulk trials of fifteen cultures at Koilpatti and Coimbatore showed six of them *viz.*, 6186-9, 6188-8, 6312-4, 6874, 7112-B-4-H and 7070-B-5, as promising and worth further study. In another test with 37 new cultures at both these places, 10 were found encouraging.

(7) **Scheme for breeding long staple American cotton as a winter crop in Central districts of Madras State:-** This scheme was put into operation in April, 1949, its objectives being (a) to produce superior *hirsutum* types having a staple of 1.1/16" to 1.1/8" and capable of being cultivated in the entire winter cropped area in Central Districts, and (b) to acclimatise or isolate a *barbadense* variety suitable for growing in the heavy rainfall West Coast districts.

During the year under report, fifteen of the widely adaptable long stapled selections were compared once more as a winter crop with Cambodia-2, 4463 and Madras Uganda-1 at Coimbatore,

Tiruchengode and Avanashi respectively. The results again showed that the two strains, viz., 9995 and 0734 were the most promising types. These fifteen new selections were simultaneously tested in Family Block and Small Bulk Trials at Coimbatore and the results showed six of them to excel Madras Uganda-1 in either staple length or ginning outturn or both. It is proposed to carry out Co-ordinated Bulk Trials with them next year at regional substations and also to purify them further wherever necessary. In addition to these bulk tests, 264 progenies were subjected to testing in replicated rows, and six of them were found to combine good yield, long staple and high ginning percentage.

As regards the acclimatisation of *barbadense* cotton, the Sea Island varieties, St. Vincent and Montessarrat were grown as a pure crop in open lands and as an inter crop in cocoanut and banana gardens. The trial was taken at a number of Agricultural Research Stations as well as on cultivators' fields at different centres in Malabar district. The crop suffered from heavy shedding of buds in the early phase. The premonsoon planted crop grown from seed or seedlings was found to be definitely better in growth, vigour and in yield than the normal crop sown with the onset of the South-West monsoon. This investigation is, however, only in the preliminary stage and much further work has still to be done.

(8) Scheme for breeding unirrigated Cambodia cotton:- The work of this scheme was started in September, 1950, at Periakulam. Its object is to evolve a hardy type of *hirsutum* cotton with over 15/16" staple length and 37% ginning outturn, and well adapted to unirrigated cultivation in the Central and Southern districts of Madras State.

In the year under review, 132 selections obtained from various sources were tested in replicated progeny rows against Madras Uganda 1 and 7682. It was found that the strain 689-18-4/4 was significantly better than the control varieties in all the three principal characters, viz., yield, lint length and ginning percentage.

In another trial with 31 second generation hybrid progenies obtained from Siruguppa and 160 first generation progenies developed at the Periakulam station, 14 of the former and 13 from the latter were found promising.

MADHYA PRADESH

(1) Scheme for improvement of cotton in Akola and Amraoti districts :- This scheme is an offshoot of the Berar Cotton Breeding Scheme which terminated on the 31st March, 1948. The object of the new scheme is (a) to produce a somewhat late ripening improved strain of *Deshi* cotton having a strong stemmed plant with a staple length of $3/4$ to $13/16$ inch and ginning percentage of 34 to 35 and (b) to evolve an improved strain of American cotton having a staple length of about 7.8" and ginning percentage of 33.

During the year under report, the work on *Deshi* cotton consisted of making 122 single plant selections from cultivators' crops and conducting replicated trials on a large number of progenies and strains. Twenty two of the latter were found promising. Trials of new varieties 091, 91, 0153 against H. 420, Jarila and local Jadi in cultivators' fields and government farms showed that the variety 91 gave an extra cash return of Rs. 15-8-9 per acre over local Jadi.

As regards work on American cotton 76 new single plant selections were made for further study. In a trial of earlier progenies and strains, 11 of them gave encouraging results. Trials of three other improved varieties were conducted on Government farms and cultivators' fields, and the results again confirmed the superiority of 0394 over Buri 107.

(2) Scheme for improvement of cotton in Buldana tract :- This scheme was put into operation in April, 1948, with the object of breeding improved strains of Jarila cotton, possessing strong stem and good opening of bolls.

In the year under report, a trial of 200 single plant progenies and 58 new strains showed that 28 progenies and 12 strains were better than ordinary Jarila. Similarly in a preliminary trial with six strains of Jarila, the strain B. 5 gave the highest yield.

In yet another experiment with M. 5A, 91, 197-3 and 907 against Jarila, the variety M. 5A not only gave significantly higher yield than Jarila but was also superior to it in staple length and ginning percentage. Furthermore this new variety (M. 5A) was adjudged suitable for spinning up to 40's standard warp counts. In addition, plant of M. 5A was found to possess a stronger stem,

better boll-opening, greater capacity to put up with adverse climatic conditions than Jarila. District trials conducted with these varieties at five places also confirmed the superiority of M.5A.

(3) **Scheme for improvement of cotton in Ghat tract of Madhya Pradesh :-** This scheme commenced its work at Yeotmal in April, 1948, its object being the evolution of high yielding strain having a staple length of 13/16" to 14/16", ginning percentage of 33 to 34, and the spinning capacity as good as that of V. 434.

During the year under review, the work of this scheme comprised study of 650 progenies, 43 new strains and 14 promising varieties of which 250, 7 and 3 respectively, appeared to be promising.

Trials conducted with M. 5A, No. 111, No. 17 and No. 91 on the cultivators' fields and Government farms to test their performance against H. 420 and Local Jadi showed that No. 91 was a more prolific variety.

(4) **Scheme for improvement of cotton in Nagpur-Wardha tract :-** This scheme started functioning in April, 1948. The objects of the scheme are (a) to evolve by selection and hybridisation somewhat late ripening strains of *deshi* cotton, with ginning percentage of 33 to 34 and capable of spinning up to 20-25's highest standard warp counts and (b) to produce by selection improved strains of American cotton with ginning percentage of about 32 and spinning capacity of 35's to 40's standard warp counts, for cultivation in the heavy soil ghat tracts of Amraoti and Morshi.

In the year under report, 520 single plant selections from *Deshi* and American cottons were made from cultivators' fields. Further, 178 progenies of *Deshi* and 151 progenies of American cottons were tested against H. 420 and 0394, respectively, and it was found that 12 *deshi* and 13 American cotton progenies were promising and fit for further study. Another 32 new *deshi* strains and 26 American strains were tested for their performance and the results showed that 4 *deshi* and 9 American varieties were superior to the respective 'control' varieties. In the District trials, the strain No. 91 (*Deshi*) and 0394 (American) again gave the best performance.

ASSAM

Scheme for improvement of hill cottons in Assam:- This scheme came into operation in February, 1947. The aim of the scheme is to produce high yielding types of coarse, short staple cotton with high ginning percentage and to introduce improved methods for their cultivation.

During the year under report, 168 progenies, of single plant selections made during the survey of the hill crop were grown for a study of their characters. It was found that the progenies from Garo hill cotton had the coarsest staple coupled with the high ginning percentage of 47.5. In the strains test, Garo 54-1 and D. 46-2-1 gave higher yields of *kapas* than the local cotton in cultivation at present.

HYDERABAD STATE

Scheme for improvement of cotton in Parbhani District:- This is an offshoot of the Scheme for Improvement of cotton of Oomras tract in Hyderabad. It was sanctioned in February, 1947, for a period of five years, with the object of (a) producing a wilt-resistant, heavy yielding and high ginning strain of cotton superior to Gaorani 12 for growing in Parbhani district, and (b) maintaining improved strains of American cotton bred for cultivation in the highlands of Aurangabad and Adilabad districts.

In the year under review, five improved strains of Hyderabad Gaorani were tested against the local on heavy black soil at Parbhani. All these proved to be earlier maturing than the control and three of them, *viz.*, II-44-1244, II-45-2204 and II-45-2513, gave significantly better yields of *kapas* than both the local variety and Gaorani 12. District trials conducted on cultivators' fields at eleven centres in Oomras tract showed that two types, *viz.*, II-44-1244 and II-45-2204, were promising in Parbhani district and II-44-1244 and II-45-2513 were well suited to the plains of Aurangabad district.

With regard to resistance to *Fusarium* wilt, nine cultures were found to show no mortality even under optimum conditions of wilt injection. The yield trial with these cultures, homozygous

for 100% wilt resistance, indicated that although none of them was superior to their parent varieties in yield, all of them had a better ginning percentage. Three of these have been retained for further study.

MYSORE.

Scheme for breeding long staple American cotton in Mysore :- This scheme which is an offshoot of Mysore Doddahathi scheme, was sanctioned in 1944 for a period of three years and was subsequently extended from time to time, the present extension having been granted in September, 1950, for a period of 4 years (i.e. up to 31st October, 1954).

The objects of the scheme are (a) the testing of Mysore-American strains evolved under the Doddahathi scheme, and (b) the acclimatisation on and breeding of Egyptian and Sea Island cottons suited to Mysore conditions.

During the year under report, a trial with Mysore American strains M.A.V., M.A.VI, M.A.IX, M.A.X, and M.A.XI and the Madras variety Co. 4 was conducted at Babur Farm. The results showed that M.A.5 was the highest yielding variety. In addition, 43 progenies, developed from crosses between M.A.V, Tide Water and Express were tested for their performance against M.A.5. Of these seven progenies were found promising.

The experiments with Egyptian cottons showed that Giza 7 and Giza 12 could be successfully grown in the State under irrigation if sown in May with a spacing of $2\frac{1}{2}$ " between rows and 9" between plants.

RAJASTHAN.

Scheme for improvement of cotton in Mewar, Rajasthan:- This scheme was put into operation in June, 1948. The object of the scheme is to evolve a strain of American or *desi* cotton capable of spinning 24's and superior to Indore 1 in staple length.

During the year under review, yield trials were conducted at two centres, Udaipur and Kapasin, with the four new strains, M. 48-4, M. 48-16, M. 48-42, M. 48-16 and Indore 1. At Udaipur, all the four new strains gave a significantly lower yield than the

control but equalled it in staple length. Two of these strains, namely, M. 48-4 and M. 48-46, had a significantly higher ginning percentage than the control. The trial at Kapasin was vitiated owing to heavy rains and consequent water-logging. The yields recorded at this site were very low and did not show any significant difference between the varieties.

Another 34 strains were tested in a preliminary experiment. Three of these, *viz.*, M. 49-105, M. 49-173 and M. 49-398 gave a promising performance. Further, 267 single plant selections were studied in progeny rows; 20 of these were found desirable.

MADHYA BHARAT.

(a) **Institute of Plant Industry, Indore:-** The aim of the cotton breeding work at this Institute is to improve *desni* cottons of Malwa and to produce a superior American variety for cultivation on *adan* lands formerly growing the poppy crop.

(1) **Improvement of desi cottons of Malwa:-** During the year under report, a trial of four new strains against Malvi 9, Bhoj, G. 16 and Jarila showed that Malvi 9 and Malvi 10 gave the highest yield, and that Malvi 10 was superior to Malvi 9 in ginning outturn, spinning performance and resistance to wilt. Malvi 12 failed to repeat its good performance of the previous season. In another experiment, nine new varieties, developed from crosses of Malvi 9 and Bhoj with Jarila, were tested against Malvi 9 and Bhoj, and only 5 of these were found promising. Besides this, yield tests were conducted with 75 strains obtained from the hybrid material involving Malvi 9, Jarila, Bhoj and Verum varieties. The results showed that 17 of these strains deserved a further trial. In a progeny test with 229 fresh selections possessing desirable yield and staple together with satisfactory wilt resistance, only 29 progenies gave encouraging results.

(2) **Production of American varieties for Malwa Adan lands:-** The trial of 8 American strains (developed at Indore) against Dhar-Cambodia and Buri 107 at Badnawar is said to have suffered from lack of attention and as such no useful results were obtained from it. Out of 37 fresh single plant selections in the American material

at Indore, 7 were found desirable in respect of ginning percentage and staple length.

(b) Scheme for improvement of Nimar cotton in Madhya Bharat:- This scheme was put into operation in June, 1948, with the object of producing a strain of cotton that would combine the yielding capacity of the local Nimari with the ginning percentage, spinning quality and wilt-resistance of Jarila. This was sought to be achieved by (a) making further selections in Jarila, local Nimari and other strains and (b) hybridising Nimari and Malvi strains with Jarila and Verum selections from Madhya Pradesh and other superior quality *arboreums*.

During the year under report, three new strains, viz., D. 46-5, D. 47-20 and D. 47-21 produced under the scheme, and three improved varieties from adjoining States were tested against Jarila and local Nimari. The trial showed that the performance of the new strain D. 46-5 was outstanding in respect of yield spinning quality and ginning percentage.

Preliminary varietal trial, strains test and preliminary strains test conducted with 26, 23 and 28 selections respectively, showed that several strains were desirable in yield and other characters. Further, 205 progenies from single plant selection were studied in detail; only two of these were found to be promising.

PERENNIAL COTTON

Stray plants of tree cotton of different varieties are found growing in almost all parts of the country. They occur either as voluntary growth in field hedges, gardens and other similar localities, or as plants intentionally grown in compounds of temples and residential houses in both villages and large cities. In parts of Madras, one variety is grown as a field crop, plants being allowed to stand for a period of 3 successive years. In southern India and the Western Coastal districts, where the winters are very mild, volunteer plants of even annual cotton tend to assume a perennial habit if allowed to stand uncut. During the past few years, the Department of Agriculture, Madras had experimented with a few imported varieties of tree cotton. In order to assess the role which the perennial cotton may play in increasing cotton production without encroaching on the area under food crops, the Com-

mittee sanctioned a special grant in 1950. The progress of the work done in the year under review is described below :—

The seed of Kidney cotton and a free seeded *barbadense* variety from plants found growing in compounds of residential houses at Dharwar in Karnatak, had been sown on about 3/4 acre in June, 1949, on tops of small ridges made on a hill slope near Bombay. This crop had received a rainfall of 108 inches from June to September, 1949. It was observed that the rank growth of weeds during the rainy months was the most serious problem to tackle. The weeds could not be effectively controlled during the wet season, with the result that the growth of cotton plants was hampered a great deal. Furthermore, some plants died of blackarm disease in the dry period from October to May. With the arrival of the following monsoon in June, 1950, the surviving cotton plants put forth fresh foliage and made good growth in the next 3 months, attaining a height of 5 to 8 feet by the end of September. Flowering started in October but some of the plants did not produce flowers until as late as end of December. The yield of *kapas* varied from 3 to 6 ozs. per plant. From the experience of the first two seasons, Kidney cotton was not able to establish itself on waste land in a high rainfall area if it did not receive adequate cultivation and care in the initial stages and if it was not resistant to 'black arm'.

On the other hand, this variety as well as other perennial types thrived well in sheltered situations like house-compounds, where proper attention was given to the plants during the period of initial growth,

From the reports received from Madras, it was found that the performance of Moco cotton in all cotton tracts was uniformly encouraging. In the State of Hyderabad, the work done with Kidney, Moco, *barbadense* and *religiosum* varieties at a number of different localities showed that the plants sown in house compounds before the monsoon and hand watered as and when necessary made good growth and produced a few bolls even in the first season. On the other hand, the seed sown after the monsoon had set in ; produced plants that gave no yield in the first year. Exactly similar results were obtained at Dharwar and other localities in Karnatak.

CHAPTER IV

EXTENSION WORK IN THE STATES.

The results of the crop improvement work financed by the Committee are carried to the cultivators by means of various seed distribution and extension schemes operated in the different States. The multiplication and distribution of improved seed on a large scale forms a real link between the experimental station and the cotton farmer. This work has received increased attention in the recent years. In the year under review, there were 17 seed distribution schemes in operation as compared with 15 schemes in 1950 and 20 schemes five years earlier. The Committee has so far spent a total sum of Rs. 33.8 lakhs on subsidising such extension schemes.

A brief report on the work of the seed schemes in the year in 1950-51 is given below :

BOMBAY

(i) **Jarila seed distribution and extension scheme :-** This scheme was sanctioned in March, 1937, with the object of replacing *Banilla* variety on 155,000 acres in Khandesh with the wilt-resistant variety Jarila. Subsequently the target area for Jarila was raised to 5 lakhs acres. The quantities of Jarila seed distributed and the estimated total area sown with this variety in the last three years are shown below :-

Year	Quantity of seed distributed under the scheme (Mds of 52 2/7 lbs)	Estimated total area under Jarila (Acres)		
		Under seed supplied by Deptt	Under seed supplied through approved agents	Total
1945-49	25,113	1,24,131	1 23 608	2,47,739
1949-50	25 101	92,458	1 34,727	2,27,185
1950-51	19,737	90,000	1,00,000	1,90,000

It would be observed that the area under this variety fell from 2.47 lakhs acres in 1948-49 to 1.90 lakhs acres in 1950-51. The decline in acreage is ascribed to Jarila having lost favour with the cultivators on account of its inability to withstand late rains. During the past few years, cultivators in many parts of this tract are said to have harvested low yields and suffered financial loss on account of the damage done by late rains.

The new variety 197-3, which has been produced as an improvement on Jarila, was grown on a total area of 3,519 acres and pure seed sufficient to cover an area of 50,000 acres with it in 1951-52 was procured.

(ii) Scheme for cultivation of 1027 A. L. F. cotton in Nawapur Taluka :- The work of this scheme was started in May, 1942, with the object of covering 25,000 acres in Nawapur Taluka with 1027 A. L. F. The present object of the scheme also covers the investigation of the possibility of replacing 1027 A. L. F. by Suyog or any other high ginning, equally good variety. The quantity of seed distributed under the scheme and the area covered by it in 1950-51, in comparison with the corresponding figures for the previous two years are shown below :—

Year	Quantity of seed distributed under the scheme (Mds.)	Estimate of area covered (acres)		Total
		Under seed supplied by Department.	Under seed supplied through approved agents.	
1948-49	1,982.2	10,000	...	10,000
1949-50	1,826.2	8,600	...	8,600
1950-51	1,739.4	4,739	4,001	8,740

714 Agmark certified bales were produced in the departmentally controlled area and these were later sold at a premium of Rs. 20/- per candy (784 lbs. of lint) over the ordinary bales.

The results of the comparative yield trials conducted with improved varieties indicated that the new strain 2087 was not only higher yielding than 1027 A. L. F. but was also wilt resistant and better ginning.

(iii) **Scheme for multiplication and distribution of 'Vijay' cotton in Middle Gujarat :-** This scheme was started in December, 1943. Its object was to replace local Broach and B. D. 8 cottons by Vijay cotton over an area of 5 lakhs acres in the Narmada-Mahi and Mahi-Sabarmati zones of Middle Gujarat. The quantities of seed distributed during the past three years and the areas covered are shown in the following statement :—

Year	Quantity of seed distributed under the scheme. (Mds.)	Estimate of area covered (Acres)		Total
		Under seed supplied by Deptt	Under seed supplied through approved agents.	
1948-49	19,370	1,04,350	1,10,216	2,14,566
1949-50	13,429.7	1,00,085	2,08,185	3,08,270
1950-51	24,948	1,00,000	3,17,558	4,17,558

The crop is said to have suffered from uneven incidence of monsoon and the absence of late rains. The yield of the crop ranged from 300 to 350 lbs. of kapas per acre as against the normal yield of 450 to 500 lbs. Similarly, the ginning outturn was only 38.0 per cent as against 39.5 per cent in the previous year. Despite these ill effects of the season, it is estimated that the growers of this variety earned Rs. 5/- per acre more than those who grew the ordinary variety in the adjoining areas of merged States. On this basis, the additional income from Vijay cotton in the year under review is said to have been about Rs. 20 lakhs. 9,666 pressed bales of Vijay cotton from the controlled area were certified for purity and sold at a premium of Rs. 10/- per acre over uncertified cotton.

(iv) **Scheme for distribution and multiplication of 'Vijay' cotton in Baroda :-** This scheme was put into operation in April, 1944, with the object of replacing the local Broach variety with Vijay cotton in Baroda district lying between the Narmada and Mahi rivers.

In the year under review, 31,274 maunds of Vijay seed were distributed and the area covered was 3.02 lakhs acres against 2.65 lakhs acres in the previous year. Arrangements were made for

the agmarking of the produce of improved seed. The agmarked bales are said to have been sold at a premium of Rs. 20/- per candy.

(v) Scheme for multiplication and distribution of Kalyan (K. 72-2) cotton in Ahmedabad district :- This scheme was put into operation in April, 1947, for extending the cultivation of Kalyan cotton in Ahmedabad district. The quantities of seed distributed and the areas covered, together with the estimated additional income earned by the farmers during the past three years are shown below :—

Year	Quantity of seed distributed under the scheme (Mds)	Estimate of area covered (Acres)			Estimated additional income	
		Under seed supplied by Deptt.	Under seed supplied through approved agents.	Total	Per acre Rs.	Total Rs.
1948-49	4,140.9	12,057	..	12,057	1-6-0	16,270
1949-50	8,628.7	34,025	975	35,000	13-8-0	4 72,500
1950-51	18 227	63 394	10,000	73,394	19-4-0	14 12 834

About 22,000 bales of Kalyan cotton were estimated to have been produced as against 11,120 bales in 1949-50. It is reported that the improved variety fetched a premium of Rs. 115/- per candy of lint over Local-Wagad.

(vi) Scheme for multiplication and distribution of Kalyan cotton seed in Mehsana district :- The work of this scheme was started in February, 1949, with the object of replacing Wagotar cotton by Kalyan over an area of about 2 lakhs acres in the Wagad tract in Mehsana district. The quantities of seed distributed and the areas covered in the year under report as compared with the previous year are shown below :—

Year	Quantity of seed distributed under the scheme (Mds)	Estimate of area covered (Acres)			Estimated additional income	
		Under seed supplied by Deptt.	Under seed supplied through approved agents.	Total	Per acre Rs.	Total Rs.
1949-50	583	...	...	*1,375	11-4-0	15,468 /-
1950-51	6,597	21,552	5,000	26,552	19-4-0	511,126 /-

* This low area is reported to be due to famine conditions in the previous year

The area of Kalyan cotton in 1949-50 was not proportionate to the quantity of seed distributed because owing to inadequate rains at the time of sowing, all the seed could not be sown.

The total production in the year under review was estimated at 8,000 bales and the produce is said to have been sold at a premium of Rs. 115/- per candy over the Local Wagad.

(vii) **Scheme for multiplication and distribution of Suyog cotton in Surat tract (south of river Narmada) :-** The work of this scheme was started in April, 1945, with the object of replacing 1027 A.L.F. and 1A cottons by Suyog over an area of 2 lakhs acres in the Surat tract of Bombay State lying south of river Narmada, excluding Nawapur taluka of West Khandesh district. The target area has since been increased to 3.6 lakhs acres owing to the merging of Baroda, Rajpipla, Sachin and Bansda States in Bombay. The progress of seed distributed and the area covered during the past three years is shown in the following statement :—

Year	Quantity of seed distributed under the scheme (Mds.)	Area covered.
		(Acres)
1948-49	14,139.8	80,000
1949-50	30,913	2,72,947
1950-51	26,237	3,43,000

Of the total area of 3.43 lakhs acres under this variety, 1.24 lakhs acres were controlled by the Agricultural Department of the State. The produce of the controlled area amounted to 32,570 bales of which 4,489 bales were 'agmarked' and the remainder were 'certified'. The 'agmarked' cotton realised a premium of Rs. 20/- per candy (784 lbs. lint) and the 'certified' cotton Rs. 10/- per candy over the price of the uncertified cotton.

In the comparative yield trials conducted at 7 different localities with Suyog and 3 new varieties, the strain 2087 outyielded Suyog at 5 places and was equal to it in yield in the remaining 2. The new variety (2087) is highly wilt-resistant and is slightly better than Suyog in spinning performance.

(viii) **Scheme for multiplication and distribution of Jayadhar and Laxmi cottons in Bombay-Karnatak :-** This scheme was put into operation in March, 1950, for replacing the existing varieties Jayawant and Gadag No. 1 by the new strains Jayadhar and Luxmi. The work in the year under review covered the distribution of the seed of all four varieties because the seed of the new types was insufficient to cover the entire area under cotton. The quantities of seed distributed and the areas covered are shown below :—

Variety	Seed distributed in lbs.	Area covered, (acres)		
		Under seed supplied by Deptt.	Under seed supplied through approved agents.	Total
Jayawant	36,11,860	3,46,099	2,91,314	6,37,413
Jayadhar	20,59,960	1,97,811	42,389	2,40,200
Gadag No. 1	3,51,900	35,421	97,350	1,32,771
Laxmi	9,81,400	98,034	2,000	1,00,034

The premia said to have been realised by the produce of the improved varieties in comparison with that of local Kumpta were as follows :—

Variety.	Premium realised per Naga (1344 lbs. of kapas). Rs.
Jayawant	Rs. 10/- to Rs. 15/-.
Jayadhar	Rs. 25/- to Rs. 90/-.
Gadag No. 1	Rs. 15/- to Rs. 30/-.
Laxmi	Rs. 150/- to Rs. 300/-.

PUNJAB.

(i) **Scheme for multiplication and distribution of L. S. S. American cotton in Ferozepore district :-** The work of the scheme was started in October, 1948, with the object of establishing L.S.S. cotton in the Ferozepore district. In the year under review, 8,359 maunds of pure seed sufficient to cover 66,870 acres were distributed as compared with 5,259 maunds for 42,072 acres in 1949-50. The work of the scheme was also directed towards increasing the

area under this variety as a whole. The progress made in this direction in the three years ending August, 1951, was as follows:—

Year.	Area in acres.	Production in bales.
1948-49	42,902	22,628
1949-50	85,066	53,422
1950-51	148,800	79,750

This rapid increase in the area and production of L.S.S. cotton in Ferozepore district has been attributed, on a large measure, to the enforcement of the " Punjab Pure Seed and Seedlings Act " to the tehsils of Fazilka and Muktsar. Under this Act, the growing of L.S.S. variety was made compulsory. The produce of registered growers, whose crop had been inspected and rogued by the Agricultural Department amounted to 31,969 maunds of kapas and this was said to have been sold at a premium of Rs. 2/6/- to Rs. 2/12/- per maund in comparison with the prevailing rate for the ordinary L.S.S. cotton. It is estimated that the growers of L.S.S. cotton, taken as a whole, earned an additional income of Rs. 49.8 lakhs in 1950-51.

(ii) **Scheme for multiplication and distribution of 216F cotton seed in Hariana tract** :— This scheme was put into operation in July, 1950, with the object of replacing short staple *desi* cotton with 216F American cotton on an area of 1,11,000 acres in the canal irrigated Hariana tract of Punjab. 1,300 maunds of pure seed were distributed to cover 5,600 acres in Hissar and Rohtak districts. 14 villages of Hansi tehsil were declared as a ' Protected Area ' for 216F and 2619 acres were rogued, yielding 8750 maunds of pure seed for distribution in the following season. It is stated that the produce of the rogued area was sold at a premium of Rs. 5/12/- per maund of kapas in comparison with the produce of the unrogued area.

MADRAS.

(i) **Scheme for maintenance of nucleus of pure seed of improved varieties of cotton in Madras State** :— This scheme was started in

September, 1938, with the object of maintaining a nucleus supply of selfed seed for certain specified varieties. The area of crop 'selfed' and the quantity of 'selfed' seed produced in the year under report were as shown below :—

Name of variety	Area selfed. (Acres)	Quantity of selfed seed produced. (lbs.)
Co. 2	1	110
Madras-Uganda 1 in place of Co.3	1	139
K. 2	2	406
H. 1	2	88
N. 14	2	60

(ii) Scheme for multiplication, distribution and marketing of Co.4 cotton :- This scheme came into operation in February, 1948. The object of the scheme is to cover the entire summer crop area in Ramnad, Mathurai, Tirunelveli and South Arcot districts with Co.4 cotton and distribute the same seed in the districts of Coimbatore, Salem and Tiruchirapalli for cultivation in the cold weather. The progress of the work of scheme during the last three years is indicated below :—

Year.	Quantity of seed distributed under the scheme (Mds.) 82-2/7 lbs.	Area covered. (Acres)			Estimated additional income	
		Departmental seed	Non-departmental seed.	Total.	Per acre Rs.	Total Rs.
1948-49	304.8	1,297	...	1,297	...	...
1949-50	3,176.8	22,677	17,595	40,272	50	20,13,600
1950-51	7,698.7	27,000	17,000	44,000	47/8	20,90,000

In the year 1950-51, the new strain Co.4/B40 (subsequently named Madras-Uganda 1) was substituted for the variety Co.4. The total quantity marketed during the year under the name Madras-Uganda 1 was estimated at 30,000 bales. This variety was exempted from Price Control and is said to have been sold at a premium of Rs. 200/- per candy in comparison with the ordinary produce of Co.4.

(iii) **Scheme for multiplication and distribution of G. 1 cotton in Guntur district :-** This scheme commenced working in August, 1948. Its object is to replace the ordinary Cocanada cotton by the improved variety G. 1 in Guntur district. The quantities of seed distributed, areas covered and estimated additional income earned by the growers during the past three years are shown in the statement below :—

Year	Quantity of seed actually distributed under the scheme (Mds. 82-2/7 lbs.)	Area covered, (acres)			Estimated additional income.	
		Depart-mental seed.	Non-depart-mental seed.	Total	Per acre Rs.	Total Rs.
1948-49	1,835	160	840	1,000	18	18,000
1949-50	8,100	800	200	1,000	19/8	19,500
1950-51	24,615	2,800	6,000	8,800	19/8	1,71,600

MADHYA PRADESH.

(i) **Scheme for distribution and marketing of Jarila cotton in Madhya Pradesh :-** The work of this scheme was started in March, 1944, with the object of extending the cultivation of Jarila cotton in Buldana district. In the year under review, 6,919 maunds of seed were distributed as compared with 2,449 maunds in 1949-50. The area covered by the improved seed was 17,474 acres as against 13,500 acres in the previous year. It is stated that another 4.06 lakhs acres were sown with the seed of the same variety through natural spread. It is also estimated that the growers of Jarila cotton earned an additional income of Rs. 10.84 lakh.

HYDERABAD.

(i) **Scheme for multiplication and distribution of Parbhani-American cotton seed in Adilabad district of Hyderabad State :-** This scheme was put into operation in May, 1950, for the purpose of replacing *deshi* cotton grown in this tract by the improved, superior spinning variety Parbhani-American. During the year under report, a total quantity of 8,936 B. Maunds of seed was distributed and the area covered was 58,000 acres. The produce is said to have realised a premium of Rs. 1/10/- per maund of kapas over the

local *desi*. On this basis, the growers of the improved variety are said to have earned an additional sum of Rs. 58 lakhs.

(ii) Scheme for multiplication and distribution of Gaorani 12 in the Gaorani Protected Area of Hyderabad State :- This scheme started functioning in October, 1950. Its object is to multiply and distribute pure pedigree seed of Gaorani 12 in the south and western portions of Gaorani Protected Area and to organize the marketing of the produce. In the year under review, 5,193 maunds of seed was distributed to cover an area of 26,000 acres. Owing to late commencement of the south-west monsoon and the subsequent break of one month in the rains, the crop is said to have been affected adversely, resulting in the giving up of some of the sown area. The boll-worm attack is also said to have damaged the crop appreciably. 7,221 maunds of pure seed were purchased for distribution in the following season.

MYSORE STATE.

(i) Scheme for multiplication and distribution of Sel. 69 and M.A. 5 in Mysore :- This scheme was put into operation in January, 1946, with the object of extending the cultivation of (1) Sel. 69, an improved *deshi* cotton in the black soil tract of the State covering an area of about 64,000 acres and (2) Mysore-American M.A. 5 in the red soil tract of about 20,000 acres, under rainfed as well as irrigated conditions. In the year under review, the total area of Sel. 69 grown from seed distributed under the scheme was estimated at 9,667 acres as against 2,960 acres in 1949-50. Similarly, the area under the improved American variety M.A. 5 was assessed at 18,218 acres against 5,290 acres in the previous year. M.A. 5 was also said to have been grown as an inter-crop on another area of 5,391 acres. The produce of this variety was said to have fetched a maximum price of Rs. 30/- per maund of kapas as compared with Rs. 13/- only for the local mixture. M.A. 5 is gaining rapid popularity with the farmers.

CHAPTER V.

PROGRESS IN THE INTRODUCTION OF IMPROVED VARIETIES OF COTTON.

The area under improved varieties of cotton in India in 1950-51 was 6.99 million acres as against 6.04 million acres in the previous year. In both the years, the improved varieties covered about 50% of the total cotton area in the country.

The improved varieties in cultivation were mainly of medium and long staple types as it has been the policy of the Committee to increase the production of such cottons. The production of long, medium and short staple cottons in the Indian Union during the last 2 years together with the corresponding averages for the quinquennia 1939-1944 and 1944-1949, is shown below :—

(In thousand bales of 392 lbs. net)

Year (1st September to 31st August)				Production (Based on official cotton forecasts)-			
				Long staple (7/8" and above.)	Medium staple (Below 7/8" and above 1 1/16").	Short staple (1 1/16" and below).	Total
Average 1939-44	...	...	...	755 (19)	1,386 (36)	1,771 (45)	3,912
Average 1944-49	...	...	...	381 (18)	1,044 (50)	676 (32)	2,101
1949-50	...	...	...	492 (19)	1,345 (51)	791 (30)	2,628*
1950-51	...	...	...	627 (22)	1,415 (48)	884 (30)	2,926

N B. —Figures within brackets indicate percentages of total production.

*Adjusted on the basis of the relationship between the official and non official estimates of production for 1947-48 and 1948-49.

It will be seen that the proportion of long staple cotton in the total production during the year under review was 22% against 19% in the previous season.

The figures of yield per acre based on two sets of data, viz., the official estimates of production and the estimates of actual crop calculated from cotton pressed, cotton consumed in mills,

extra factory consumption, etc., are given in the following Table for the last two years together with the corresponding averages for the two quinquennia ending 1949 :—

Year (1st September to 31st August).	Area (Thousand acres)	Production as per Government Estimates. (Thousand bales of 392 lbs.net)	Yield of lint per acre on the basis of Government Estimates of production.	*Approximate Actual production (Thousand bales of 392 lbs. net).	Yield of lint per acre on the basis of actual crop.
1	2	3	4	5	6
Average 1939-44	18,391	3,912	Lbs. 83	4,417††	Lbs. 94
Average 1944-49	11,280	2,101	73	2,637††	92
1949-50	12,173	2,628	85	2,927	94
1950-51	13,859	2,926	83	3,334**	94

* Best estimate of the crop as arrived at by the Indian Central Cotton Committee in connection with the annual *post-mortem* examination of official cotton forecasts.

†† For the years 1939-44 to 1946-47 details of production separately for India and Pakistan are not available and those for India given in the above table are based on the assumption that the actual crop figures for the two countries would be in the same proportion as the corresponding official estimates of production.

** Provisional.

It will be seen that the average yield per acre as estimates from the actual crop was 94 lbs. in both 1949-50 and 1950-51, as compared with the average yields of 94 and 92 lbs. for the quinquennia 1939-44 and 1944-49 respectively.

The main principle governing the Committee's policy regarding the spread of improved varieties of cotton is the extra income that the new varieties yield to the grower. On the basis of the data furnished by the various States in respect of the improved varieties, for the extension of which special seed distribution schemes were in operation, it is estimated that the additional income earned by the growers of improved varieties in the country during 1950-51 was about Rs. 5.25 crores.

The progress made in the introduction of improved varieties of cotton in the major cotton growing States is dealt with below :—

BOMBAY STATE.

(a) **Wagad tract (North Gujarat):-** The total area under cotton in this tract during the year under report was 6.63 lakh acres out of which one lakh acres were sown with Kalyan, the improved Wagad type, and the remaining area with the ordinary Wagad seed. Another improved variety Pratap, evolved for replacing the short staple Mathio cotton was grown on 82 acres in Amreli district for multiplication of seed. 73,000 maunds of pure seed of Kalyan and 80 maunds of Pratap were purchased and distributed for sowing in the following season. This would be enough to cover about 3.7 lakh acres.

About 32,600 bales of Kalyan were produced and it is reported that a premium of Rs. 115/- per candy over local Wagad was paid for it.

(b) **Broach tract (Middle Gujarat):-** The total area under cotton in the tract between the rivers Narmada and Sabarmati was 7.77 lakh acres. The improved variety 'Vijay' covered 7.19 lakh acres against 5.74 lakh acres in the previous season. Vijay is popular with the cultivators as well as the trade. The area controlled by the Department is said to have been 84,492 acres only and the produce harvested therefrom was 18,768 bales, which were either 'agmarked' or 'certified' for purity. For sowing in 1951-52, about 74,000 maunds of pure Vijay seed were distributed.

(c) **Surat tract (South Gujarat):-** An area of 3.16 lakh acres was under cotton in this tract. The whole of this area was covered by the improved variety Suyog. Of this, 1.26 lakh acres (including 1,453 acres sown with pedigree seed) was controlled by the department. The total produce of the controlled area amounted to 32,570 bales, of which 4,489 bales were agmarked and 28,081 were certified. 32,413 maunds of pure seed of Suyog, sufficient to cover about two lakh acres, were distributed under the Departmental supervision for sowing in 1951-52.

(d) **Nawapur area:-** The Nawapur taluka of West Khandesh district also grows the Surti type, 1027 A. L. F. The total area

under this variety in the year under review was 8,740 acres of which 4,739 acres were controlled by the State Agricultural Department. The produce of the controlled area amounting to 717 bales was agmarked for purity and sold at a premium. 1852 maunds of pure seed of 1027 A. L. F. are said to have been distributed for sowing in the following season.

In extensive trials conducted on the cultivators' fields in Surat district, another new strain 2087 was found superior to Suyog in yield, spinning performance and wilt-resistance. It is also an early maturing type. The multiplication of the seed of this new strain has already been started. About 55 maunds of its seed were distributed for sowing in 1951-52.

(e) **Khandesh tract:-** In the previous year the Government of Bombay had lifted the ban against the cultivation of varieties other than Jarila because the latter variety had been found to suffer severely from late rains. As a result of this step, the area under Jarila fell from 2.27 lakh acres in 1949-50 to only 90,000 acres in the following year. The total cotton area in this tract in the year under review was 2.92 lakh acres out of which nearly 2 lakh acres were sown with the seed of the short staple mixed *desi* variety obtained from Madhya Pradesh and Hyderabad.

The breeding work done in the past few years at Jalgaon under a scheme financed by the Committee has yielded a new strain 197-3 (now named 'Virnar') which is superior to Jarila in its ability to withstand late rains. This new variety was grown on 3,519 acres for seed multiplication and 11,361 maunds of its pure seed were secured for sowing about 50,000 acres in 1951-52.

(f) **Kumta-Dharwar tract:-** The total area under cotton in this tract in 1950-51 was 10.02 lakh acres. The entire area was sown with the four improved varieties Jayawant, Jayadhar, Gadag 1 and Laxmi. The area under each variety was as follows:-

Variety			Area (Lakh of Acres)
Jayawant	...	..	5.30
Jayadhar	...	...	2.40
Gadag 1	...	..	1.32
Laxmi	...	...	1.00
			<hr/> 10.02

The Department of Agriculture had under its control 30,000 acres of Jayawant, 73,000 acres of Jayadhar and about 22,000 acres of Laxmi cotton. Certificates of purity were granted for 2,148 bales of Jayadhar and 11,002 bales of Laxmi cotton.

It is proposed to replace Jayawant and Gadag 1 wholly by the new varieties Jayadhar and Laxmi. Pure seed sufficient to cover the entire cotton area Kumpta-Dharwar tract in 1951-52 is stated to have been stocked by the Department.

The Cotton Transport Act and the Cotton Control Act continued to remain in force during the year.

MADRAS STATE.

The total estimated area under cotton in the year under report was 16.2 lakh acres and the total production, 3.30 lakh bales.

(a) Cambodia tract (Districts of Coimbatore, Madurai, Salem and Tiruchirapalli) :- The total area under Cambodia cotton was 2.82 lakh acres, of which 1.04 lakhs acres were under the improved variety Co.2 and 0.53 lakh acres under Madras-Uganda 1. Of the remaining area, about 12,000 acres were sown with the improved varieties Co.3, 4463 and 920, and the balance with ordinary Cambodia cotton.

A notable feature during the year was the introduction of the Punjab American 216F as an off-season crop in rice fallows of Tanjore Delta and parts of South Arcot district and as a mixed crop with groundnuts and chillies in other parts of the State. The total area covered by Punjab 216F was 3,538 acres. The results of these trials would be watched with interest.

For sowing in 1951-52, about 10,000 maunds of seed of improved varieties were distributed by the Department and about 4,300 maunds through the Co-operative Societies.

(b) Tinnevellies tract (Kollpatti and Coimbatore) :- The total area under Tinnies cotton in 1950-51 was 3.99 lakh acres, nearly

60% of which was under improved Karunganni varieties as shown below :—

Variety.			Area (Lakh of acres)
K.1	...	...	0.47
K.2	...	...	1.17
K.5	...	...	0.79
Total			2.43

For the year 1951-52, 11,800 maunds of pure seed was distributed by the Department, and 6,037 maunds by the Co-operative Societies.

(c) Salem area (Salem district) :- The area under Salems cotton was 13,300 acres, of which 1,885 acres, i.e. 14.2%, were under the improved variety K. 5. For the year 1951-52, the Department distributed about 235 maunds of K.5 and about 90 maunds of the Madhya Pradesh variety, H.420, which is said to have given good results in the preliminary trials of the previous year.

(d) White and Red Northern tracts (Central Kurnool):- The area under Northern cotton was 1.2 lakh acres. The only improved strain under cultivation in this tract is N.14, which covered 20,550 acres in the year under review. N. 14 has a low ginning outturn and is, therefore, not very popular. Work for the production of a better variety for this tract is in progress.

(e) Warrangal and Cocanadas tract (Districts of Guntur, Kurnool, Nellore, Krishna, East and West Godavary) :- The estimated cotton area of this tract was 63,800 acres. The improved variety Cocanadas1 was grown on 5,896 acres for multiplication of seed. Due to unfavourable season, the crop is said to have given low yield. Therefore, only 700 maunds of improved seed was secured and distributed by the Agricultural Department for sowing about 4,000 acres in 1951-52. In addition, 166 maunds of seed of the Madhya Pradesh variety N. 420 was distributed.

(f) Chinnapathi tract (Visakhapatnam district):- The area under cotton in this tract was 3,400 acres. The new variety H. 420 of Madhya Pradesh was introduced in this tract and it covered 477 acres in the year under report. For sowing in 1951-52, the Department distributed about 80 maunds of seed of H. 420.

(g) **Westerns tract (Districts of Bellary and Anantapur):**— Out of the total cotton area of 5.76 lakh acres in this tract, about 4.5 lakhs acres are said to have been grown with the improved variety Westerns-1. The Agricultural Department supplied the improved seed for only a part of this area, the remaining area being sown with the farmers' own seed. For the 1951-52 crop, the Department distributed 3,914 maunds of Westerns-1 seed.

(h) **Mungari tract (Districts of Anantapur, Bellary and Kurnool):**— The area under the short staple Mungari cotton was 1.96 lakh acres. No improved variety is available for large scale cultivation in this tract. However, as a result of the breeding work conducted at Adoni under a scheme financed by the Committee, a medium staple strain called 881F, has been evolved and found to give good results. The Agricultural Department distributed 2,870 lbs. of seed of this variety to cover an area of 287 acres in 1951-52. For the further extension of its cultivation, the Committee has recently sanctioned a seed multiplication and distribution scheme.

PUNJAB STATE.

The total area under cotton in the State during the year under review was 4.45 lakh acres against 3.22 lakh acres in 1949-50 and 2.28 lakh acres in 1948-49. Of the cotton area in 1950-51, 1.57 lakh acres were grown with American cotton and 2.88 lakh acres with *deshi* varieties. The Total production during the year was made up of 82,200 bales of American cotton and 1,09,000 bales of *deshi* cotton.

(a) **Ferozepore District:** This is the most important cotton growing district of Punjab, the crop being grown almost wholly under canal irrigation. Its total cotton area in 1950-51 was 1.95 lakh acres, out of which 1.49 lakh acres were under American cotton and the remainder under *deshi*. The improved American variety L. S. S. occupied the entire area under American cotton. The Agricultural Department distributed 8,153 maunds of seed of this variety for sowing about 40,700 acres in 1951-52.

The Punjab "Pure Seed and Seedlings Act" was enforced in Fazilka and Malkapur tehsils.

(b) **Haryana tract (Hissar, Rohtak, Karnal and Gurgaon districts):**— The total area under cotton in this tract was 1.02 lakh acres, out of which 6,600 acres were under the improved American variety Punjab 216F and the remainder under *deshi*. The Agricultural Department supplied 1,400 maunds of pure seed of Punjab 216F and 1,320 maunds of the improved *deshi* variety M. 60A. 2. The improved *deshi* variety, M. 60A. 2, was grown on an area of 57,100 acres, but the remaining area was still under ordinary mixed seed of Punjab *deshi* cotton.

(c) **Central Districts (Amritsar, Jullundur and Ludhiana):**— The total area under cotton in this tract was 1.09 lakh acres, out of which 600 acres were under American cotton and 10,900 acres under an improved Mollisoni type. The rest of the acreage was under non-descript *deshi* cotton seed. The Department distributed the following quantities of improved seed in this tract:—

Mollisoni 60A.2	...	132 maunds
L. S. S. American	...	244 „
Punjab 320F	...	10 „
Punjab 216F	...	100 „

(d) **Sub-montane tract (Gurdaspur, Hoshiarpur and Ambala Districts):**— The total area under cotton in this tract in 1950–51 was 33,500 acres, out of which 2,900 acres were reported to have been grown with the improved Mollisoni variety M. 60A. 2 and the remainder with ordinary Punjab *deshi* cotton. The area under improved variety is said to have been sown almost wholly with seed retained by the cultivators themselves from the previous year's crop.

MADHYA PRADESH

The total area under cotton in the State during the year under report was 27.76 lakhs acres against 27.71 lakhs acres in the previous year. The total production was estimated at 5.5 lakh bales as compared with 3.0 lakhs bales in 1949–50.

(a) **Nagpur - Wardha tract:**— The total area of cotton in this tract in 1950–51 was 6.35 lakh acres. The three improved *deshi*

varieties, viz., V.434, Jarila and H.420 were grown on varying areas, besides the ordinary Oomra deshi and the American types Buri and Cambodia. The area under V.434 and Jarila was insignificant but that under H.420 was 20,880 acres, for which the seed was supplied by the Department of Agriculture.

(b) **Akola-Amraoti tract:-** The total cotton area of this tract in the year under review was 6.52 lakh acres, the major portion of which was under Jarila variety grown from ordinary seed. The new variety H.420, which is superior to Jarila in yield and spinning performance has been introduced and is gradually taking the place of Jarila cotton. The Department of Agriculture distributed H.420 seed sufficient for 40,000 acres.

(c) **Ghat tract:-** The total area under cotton in this tract was estimated at 6.52 lakh acres. The greater part of this area was under ordinary Oomras cotton. The Department encouraged the cultivation of H.420 and distributed its seed so as to cover an area of 31,846 acres. It is stated that another 7,000 acres were grown with this variety with seed retained by the farmers from their crops of the previous year.

(d) **Buldana tract:-** This tract grows almost exclusively the improved Jarila variety. The area under Jarila in the year under review is said to have been 4.37 lakh acres out of the total cotton area of 4.56 lakh acres. The Department of Agriculture supplied Jarila seed for about 18,000 acres only. The growers of the remaining area planted the seed from their own crops or that obtained from ginning factories and traders.

UTTAR PRADESH

The total area of cotton in this State (including the merged States of Rampur and Benaras) was 1.06 lakh acres in 1950-51 as against 1.07 lakh acres in the previous year. As compared with the average area for the quinquennium 1944-45 to 1948-49, the area during the year 1950-51 recorded a decrease of 36.6 per cent. The total production in the State during the year under review was estimated at 45,000 bales, out of which only 300 bales are reported

to have been utilised in the mills, and the rest was used for domestic and other extra factory purposes.

Nearly 73% of the annual cotton area is located in the Western districts and about 20% in Rohilkhand, Bundelkhand and Central Uttar Pradesh districts have only a small area under cotton.

The total area under the improved varieties was 29,030 acres, made up as shown below:—

Variety			Area
C. 520	...	...	18,530 acres
M.60A. 2	...	...	7,300 „
35/1	...	...	300 „
Perso American	...	..	2,900 „
Total			29,030 „

All the remaining area was under the ordinary Bengal *deshi* variety.

The total quantity of improved seed supplied by the Department was about 5,800 maunds.

HYDERABAD STATE

The total area under cotton in the State was 23.74 lakh acres as against 21.22 lakh acres in the previous year. The area covered by the improved varieties was 5.02 lakh acres against 2.75 lakh acres in 1949-50.

(a) **Gaorani tract** (Districts of Nanded, Bidar and parts of Parbhani, Adilabad and Osmanabad).— The total area under cotton in this tract was 7.13 lakh acres, out of which 4.19 lakh acres were covered by 3 improved varieties *viz.*, Gaorani 6, Gaorani 6E.3 and Gaorani 12. The respective areas under each of these were 4.01 lakh acres, 8,000 acres and 10,000 acres.

(b) **Hyderabad American tract** (Parts of Adilabad and Auran-gabad districts):— Out of the cotton area of 1.99 lakh acres in

this tract, 59,000 acres were covered by the improved variety Parbhani American 1.

(c) Hyderabad Jarila tract (Districts of Aurangabad and parts of Parbhani and Osmanabad):- Out of 2.76 lakh acres of cotton in this tract, only 1,225 acres were covered by the improved variety Gaorani 12. It may, in this connection, be mentioned that the scheme for multiplication and distribution of Gaorani 12 started functioning rather late in the season. It is expected that a much greater area would be cultivated with this cotton in the future.

(d) Hyderabad Oomras tract:- The cotton area of this tract was 3.36 lakh acres, out of which only, 8,550 acres are said to have been planted with the improved variety Gaorani 12 which is suitable for this tract.

(e) Hyderabad Kumpta tract (Districts of Raichur and Gulbarga):- A part of this tract adjoining the Dharwar district of Bombay State is a Protected Area under the Hyderabad Cotton Cultivation and Transport Act. The total area under cotton in the protected zone was 1.10 lakh acres, out of which 12,500 acres were under the improved variety Jayawant. The remaining area was under Upland and ordinary Kumpta.

The cotton area of the unprotected part of the Kumpta tract was 6.7 lakh acres. Barring about 54,000 acres of light soil planted with short staple Mungari cotton, the whole of this area was grown with ordinary Kumpta seed.

No really suitable improved strain of Kumpta cotton is available for this region at present.

MYSORE STATE

The total estimated area under cotton in Mysore State in the year under report was 1.07 lakh acres as against 0.69 lakh acres in 1949-50. The total production for the year was 33,000 bales as compared with 19,000 bales in the previous year.

Only two improved varieties viz., M.A.5 (American) and Selection 69 (*herbaceum*) are grown on any large scale. The area

under Mysore-American was 23,610 acres and that under Selection 69 was 37,729 acres. Thus the improved varieties covered an area of 61,339 acres—i. e. 57% of the total cotton area.

Another two improved varieties, Jayawant from Bombay State and Hagari 1 from Madras were introduced on small areas.

MADHYA BHARAT.

The total area under cotton in the State in 1950-51 was 15.31 lakh acres as against 11.9 lakh acres in the preceding year.

(a) **Nimar tract.**—The total area in this tract was 4.21 lakh acres. The improved varieties under cultivation were Buri 107 and Jarila, and the respective areas covered by them were 2.03 and 1.55 lakh acres. The quantity of improved seed distributed by the Agricultural Department was 4,451 maunds of Buri 107 and 1,622 maunds of Jarila.

(b) **Malwa tract.**—The area of cotton in this tract was 11.1 lakh acres, out of which 4.44 lakh acres were under the improved varieties as shown below:-

Variety		Acreage.
Malvi-9	.	1 75,000
Cambodia	...	20,970
Indore 2	...	2,990
G. 16	.	19,990
Jarila	...	24,998
Total		4,43 948

The Department of Agriculture supplied 7,330 maunds of improved seed sufficient for about 30,000 acres. All the remaining area was sown with seed obtained from ginning factories, merchants, etc.

RAJASTHAN STATE.

The total estimated area under cotton during the year under report was 2.26 lakh acres as compared with 2.82 lakh acres in 1949-50. The three main cotton growing tracts in Rajasthan are (i) **Gang Canal Area**, consisting of the Ganganagar district, (ii)

Mewar tract comprising districts of Udaipur, Chittoor and Bhilwara and (iii) Jhalawar district. A small area is also grown with cotton in the Tonk district.

(a) **Ganganagar district.** In this tract cotton is cultivated almost wholly as an irrigated crop, and usually both American and *deshi* varieties are grown. The area covered by the American and *deshi* varieties in 1950-51 was 58,510 and 12,629 acres respectively. The improved varieties under cultivation were L.S.S. and 43F (Punjab American types).

(b) **Mewar.** The total area under cotton in the three districts of Udaipur, Chittoor and Bhilwara in 1950-51 was 1.28 lakh acres of which 26,000 acres were under irrigated crop. Mixed seed of an acclimatised American variety from Kanpur in Uttar Pradesh is usually grown under irrigation. This is now being replaced by the improved variety Indore 1, which is said to have given encouraging results in the past two years. The exact area under this variety is still small.

No improved type of *desi* cotton is available for replacing the short staple mixed cotton at present grown as a rainfed crop in the Mewar tract or Jhalawar district.

CHAPTER VI.

COTTON MARKETING, LEGISLATION AND OTHER
PROTECTIVE MEASURES.

(i) **Cotton Export Policy :-** The export policy of the Government of India regarding cotton has been conditioned by the necessity of conserving supplies to meet the needs of the local mill industry. The surplus of cotton, mostly of short staple, available after meeting these needs was allowed to be exported. In December, 1950, an export quota of 25,000 bales of Bengal *desi* to U.S.A. was announced as a special case. In January, 1951, a further quota of 1,50,000 bales of Bengal *desi* consisting of 20,000 for United Kingdom, 13,000 for soft currency countries other than U.K. and 1,17,000 for all the hard currency countries was announced. Yet another quota of 5,000 bales (4,500 bales to dollar and hard currency countries and the balance to other permissible destinations) was permitted for export in March, 1951. The total quantity of cotton exported during the season was 1,75,000 bales. In November, 1950, the Government of India enhanced the export duty on raw cotton from Rs. 100/- to Rs. 400/- per bale of 400 lbs.

(ii) **Cotton Import Policy :-** The need for making available to mills adequate supplies of cotton, particularly of long staple, continued to be the chief aim of the cotton imports policy during 1950-51. In September, 1950, the Government of India announced their decision to issue licences for the import of U.S. new crop cotton having a staple of 1-1/16" and above at prevailing prices, if such imported cotton was used for producing cloth for export. In the event of mills producing cloth for internal consumption, the ex-factory prices would be taken into account. The quantity likely to be imported was governed by the export allocation fixed by the U.S.A. Government. An agreement was also completed with the Uganda Government for the supply to India of 1,60,000 bales of Uganda cotton of 1950-51 crop. In addition, mills and importers were permitted to obtain such quantities as they could from the Uganda auctions, subject to price stipulations in so far as internal consumption of the cloth is concerned. The total quantity of cotton imported during the season under review was 8,31,000 bales, including 2,65,000 bales from the U.S.A.

(iii) **Regulated Cotton Markets :-** In the past, the Cotton Committee had recommended to the State Governments that they should establish regulated markets for the orderly and remunerative marketing of cotton. Accordingly, legislation for the establishment of regulated markets was enacted in the States of Bombay, Madras, Punjab, Madhya Pradesh and Hyderabad. In the year under report, 85 regulated markets functioned in the State of Bombay, 60 in the Punjab, 3 in Madras and 66 in Hyderabad State. The markets continued to work satisfactorily.

(iv) **Agmarking :-** During the year, Agmarking of cotton bales continued at Hubli, Gadag, Bailhongal and Savanur in Bombay State. Affixing of 'Agmark' serves as a guarantee of purity of cotton. Agmark labels are affixed to bales of cotton, the ginning and pressing of which have been supervised by a special staff. The Committee is also giving financial help to co-operative societies and growers in the Surat area to market 1027 A.L.F. and Suyog cottons under a guarantee of purity in accordance with the Agricultural Produce (Grading and Marking) Act, 1937.

(v) **Cotton Baling hoops :-** The arrangements for the distribution of cotton baling hoops were continued along the lines of the past year. During the year under report, 6,723 tons of hoops were distributed to pressing factories in the country by the Committee's office working in conjunction with the Iron and Steel Controller.

(vi) **Other requirements of Ginning and Pressing Factories :-** The arrangements for the supply of coal to cotton ginning and pressing factories on the recommendation of the Committee's Secretary and Textile Commissioner, Bombay, were continued during the season under report. The total quantity of coal recommended for supply to ginning and pressing factories during the year amounted to about 1,24,828 tons. In addition, assistance was given to the factories in the matter of obtaining iron and steel required for maintenance and repairs.

(vii) **Dismantling of Cotton Ginning and Pressing Factories :-** As in the previous years, the Committee continued to deal with applications for the grant of permission for the dismantling of cotton ginning and pressing factories, referred for opinion by the Textile Commissioner, Bombay.

(viii) **Legislation to maintain the purity of cotton and other protective measures :-** Several legislative measures have been passed by the Central and State Governments on the recommendation of the Indian Central Cotton Committee with a view to checking the spread of undesirable or inferior types of cotton, insect pests and diseases and malpractices in marketing. A brief account of the working of these measures during the year under review is given below. For more details previous reports may be referred to.

(a) **Cotton Transport Act :-** The Cotton Transport Act, in so far as it relates to rail and road transport, had been applied to the East Khandesh and parts of West Khandesh and Nasik districts of Bombay State in 1947. In 1948-49 these restrictions were extended to river transport as well. The Act continued to be in operation in the Kumpta-Dharwar, Bagalkot and Bijapur Protected Areas.

(b) **Cotton Ginning and Pressing Factories Act:-** On the recommendation of the Committee, the Government of Madras passed the Cotton Ginning and Pressing Factories (Madras Amendment) Act, 1948, providing *inter alia*, for the prevention of watering, mixing and adulteration of cotton. The U.P. Cotton Ginning and Pressing Factories Act, 1949, contains similar provisions. In the year under review a reference was received from the Madhya Pradesh Government proposing that 10 per cent admixture might be allowed for the present and that this might be reduced as the normal methods of trade began to operate. The Committee decided that the admixture in the produce of the 'Reserve Area' from which the Agricultural Department purchases its supplies of pure seed should not exceed one or two percent and that the State Government should make every effort to steadily reduce the tolerance of 10 per cent for the produce of the remaining areas. The Cotton Ginning and Pressing Factories Act, 1925, was made applicable to all part B States from the 1st April, 1951.

(c) **Prevention of Introduction of Foreign Cotton Pests:-** In order to prevent the introduction of the Mexican Boll Weevil (*Anthonomus grandis*) into India with imported American Cotton, restrictions were imposed by the Government of India under which the import of American cotton is prohibited except through the Port of Bombay. The law also requires that all imported American cotton

should be fumigated with hydrocyanic acid gas at the port of entry. From July, 1950, the import of American Cotton has also been permitted through the Port of Madras, where, arrangements for fumigation of cotton with hydrocyanic acid gas were made by the Directorate of Plant Protection and Quarantine, Government of India. The work of fumigation at the Port of Bombay was carried out under the supervision of the Secretary, India Central Cotton Committee as in the past. The cost of fumigation was met by the levy of a small fee from importers on each bale of American cotton imported and fumigated. During the year under review, 2,19,419 bales of American cotton were fumigated at the Port of Bombay as compared with 4,13,251 bales in 1949-50.

The restrictions on the import of foreign *kapas* (unginned cotton) and foreign cotton seed remained in force throughout the year.

(d) Cotton Control Act :- "Cotton Control Acts" are in operation in the States of Madras, Bombay and Madhya Pradesh, and "Pure Improved Seeds and Seedlings Act," in the Punjab.

The Madras Cotton Control Act had for its object the eradication of the short staple *Pulichai* cotton in certain areas growing improved varieties. The Bombay Cotton Control Act empowers the State Government to prescribe the standard varieties that can be grown in particular areas and to prohibit the growing, possession or trade in other varieties in these areas. The Act further provides penalties for the mixing of standard with prohibited varieties of cotton and of one standard cotton with another. The Government of Bombay relaxed from the 29th April, 1950, the restrictions imposed under the Cotton Control Act relating to the growing of Jarila in the Khandesh tract as this variety was found to suffer seriously from late rains. The Madhya Pradesh Cotton Control Act prohibits the cultivation, possession or trade in the inferior short staple Garrow Hill Cotton. The Punjab "Improved Seeds and Seedlings Act, 1949," the object of which is to compel the cultivators to sow the seed of only improved varieties in specified areas, was made applicable to two tehsils of Ferozepur district, 28 villages of Hissar district in 1949-50 and extended to 10 villages in in Karnal district in 1950-51.

CHAPTER VII

"GROW-MORE-COTTON" CAMPAIGN

Need for expanding cotton production:- The total production of cotton in undivided India in the year 1938-39, was about 59 lakh bales. Against this, the consumption by the spinning mills in the country during that year amounted to 31.5 lakh bales of Indian cotton (including about 8 lakh bales of cotton from the territories now included in Pakistan) and 6.6 lakh bales of foreign cotton. India thus produced nearly 28 lakh bales of cotton as surplus to its own requirements. This surplus was partly carried forward as stock and partly exported. The exports were mainly of short staple cotton.

During World War II, and more particularly after the entry of Japan into it, in December, 1941, the export markets for short staple cotton were lost and this cotton became a drag on the market. Special measures were then taken to curtail its production. These efforts were intensified a year later when the food position in the country deteriorated a great deal. As a result, the annual production of cotton in undivided India was brought down to 42 lakh bales in 1945-46. Practically the whole of this reduction took place in territories now comprising the Indian Union.

Subsequently, on the partition of the country in 1947, about ten lakh bales of good quality cotton produced annually in the irrigated tracts of Sind and West Punjab and used by the Indian mills were suddenly lost to India, because these Provinces were included in Pakistan. As against this, 409 out of 423 textile mills in the country remained with India after partition. The result was that the accumulated stocks from former years were rapidly used up. This exhaustion of stocks along with the virtual cessation of imports from Pakistan and the great decrease in production in 1948-49 due to unfavourable weather conditions, made the cotton supply position in 1949-50 very acute. Thus the need for expanding cotton production in the country became imperative.

and the additional production reported to have been achieved at the end of the season are shown in the table below:-

	Targets		Estimated Achievements	
	Additional area. (In lakhs of acres)	Additional production. (In lakhs of bales 392 lbs. net.)	Additional area. (In lakhs of acres.)	Additional production. (In lakhs of bales 392 lbs. net.)
A By expansion of area	19.87	4.57	15.99	3.11
B By intensive cultivation.				
(i) By irrigation	0.93	0.08	0.98	0.09
(ii) „ use of improved seed	10.02	0.25	10.00	0.23
(iii) „ application of fertilisers	4.65	0.29	2.00	0.10
(iv) „ intercropping of cotton with other crops.	14.49	0.78	1.23	0.08
(v) „ adopting improved cultural methods.	...	...	0.09	0.02
Total A & B	...	5.97	...	3.63

Figures of area against items B (i) to B (v) represent the area to which intensive cultivation measures were proposed to be or have been applied.

It will be seen that in 1950-51, against the targeted additional production of 5.97 lakh bales, the increased production reported to have been achieved was only 3.63 lakh bales. The short fall in production was due to unfavourable weather conditions. The North East monsoon failed in some of the cotton districts in Madras for the fourth year in succession. In Hyderabad, the monsoon ended prematurely. In Saurashtra, in addition to the premature withdrawal of the monsoon, the crop suffered from a spell of unusually severe cold. In some parts of Bombay, failure of late rains affected the yield of the crop.

The increased production of 3.63 lakh bales in 1950-51 relieved the cotton supply position only partially. Accordingly the Government of India in consultation with the State Governments decided to continue the “Grow-More-Cotton” campaign and laid down plans for increasing production still further in 1951-52.

K. SAWHNEY,
Secretary.

APPENDIX I.

MEMBERS OF THE INDIAN CENTRAL COTTON COMMITTEE.

- (1) **President**, Sardar Datar Singh, Vice-President, Indian Council of Agricultural Research, *ex-officio*.
The Agricultural Commissioner with the Government of India, *ex-officio*.
- (2) Representatives of Agricultural Departments:—
- | | | | | |
|-----------------------|-----|-----|-----|----------------------|
| Madras | ... | ... | ... | Shri M. S. Sivaraman |
| Bombay | ... | ... | ... | Dr. B. N. Uppal |
| Uttar Pradesh | ... | ... | ... | Dr. S. B. Singh |
| Madhya Pradesh | ... | ... | ... | Dr. R. J. Kalamkar |
| East Punjab | ... | ... | ... | Shri B. S. Sawhney. |
- (3) The Director-General of Commercial Intelligence and Statistics *ex-officio*.
- (4) Representatives of Chambers of Commerce and Associations:—
- | | | |
|---------------------------------------|-----|-----------------------------|
| The East India Cotton Association | ... | Shri Madanmohan R. Ruia |
| The Bombay Millowners' Association | ... | Shri Vithal N. Chandavarkar |
| The Bombay Chamber of Commerce | ... | Mr. L. F. H. Goodwin |
| The Indian Merchants' Chamber | ... | Shri Chimanlal B. Parikh |
| The Ahmedabad Millowners' Association | ... | Shri Madanmohan Mangaldas |
| The Tuticorin Chamber of Commerce | ... | Mr. A. Mueller |
| The Upper India Chamber of Commerce | ... | Shri J. K. Srivastava |
| The Empire Cotton Growing Corporation | ... | Mr. C. P. Bramble. |
- (5) Commercial Representatives nominated by Central Government:—
- | | | | | |
|-----------------------|-----|-----|-----|-----------------------|
| Madhya Pradesh | ... | ... | ... | Shri R. V. Deshmukh |
| | | | | Shri Kishanlal Goenka |
| Madras | ... | ... | ... | Shri C. M. Kothari |
| East Punjab | ... | ... | ... | Shri Kundan Lal. |
- (6) West Bengal Representative ... Dr. N. Dutt.
- (7) Co-operative Banking Representative ... Shri R. G. Saraiya.
- (8) Representatives of Cotton Growing Industry:—
- | | | | | |
|-----------------------|-----|-----|-----|-----------------------------|
| Madras | ... | ... | ... | Shri A. K. D. Balarama Raja |
| Bombay | ... | ... | ... | Shri M. Lakshmikantha Reddy |
| Bombay | ... | ... | ... | Shri F. B. Loxmeshwar |
| | | | | Shri S. R. Rane |
| Uttar Pradesh | ... | ... | ... | Major Nawab Mohd. |
| | | | | Jamshed Ali Khan |
| | | | | Lala Basant Lal Agarwala |
| Madhya Pradesh | ... | ... | ... | Shri S. K. Wankhede |
| | | | | Shri P. S. Patil |

East Punjab Sardar Waryam Singh.

(9) Representatives of Part 'B' States:—

Mysore	...	...	...	Dr. L. S. Doraswamy
Madhya Bharat	...	...	...	Shri N. M. Deshmukh
United States of Rajasthan	...	...	...	Dr. T. S. Sabnis
Patiala & East Punjab States' Union	...	...	...	Dr. Gursham Singh
United State of Kathiawar (Saurashtra)	...	...	...	Seth Bhogilal M. Shah
Hyderabad	...	...	...	Shri P. D. Nair.

(10) Additional Members nominated by the Governor-General in Council:—

Shri Chunilal B. Mehta	...	...	Dr. V. K. R. V. Rao
Shri Bhawanji A. Khimjee	...	...	Mr. Neville Wadia
Shri G. B. Patel	...	...	Shri R. Balasubramania Ayyar
Mr. D. N. Mahta	...	...	Pandit Thakurdas Bhargava
Shri A. S. Lall	...	...	Seth Issardas Varindmal
Shri Brijlal Nandlal Biyani	...	...	Sardar Ujjal Singh
Shri S. S. Pande.			

APPENDIX II.

SUB-COMMITTEES.

Standing Finance Sub-Committee:—Shri R. G. Saraiya (*Vice President*).
Chairman. Sardar Datar Singh (*President*) (*ex-officio*); vacant *vice* Shri Purshotam das Thakurdas; Shri Chunilal B. Mehta; Shri Chimanlal B. Parikh; Shri Vithal N. Chandavarkar; Mr. D N Mahta, Mr. L. F. H. Goodwin and Shri S. K. Wankhede.

Local Sub-Committee — President (Sardar Datar Singh); the (*Vice-President*) (Shri R. G. Saraiya), vacant *vice* Shri Purshotamdas Thakurdas; Shri Chunilal B. Mehta; Shri Vithal N. Chandavarkar, Mr. D. N. Mahta; Mr. L. F. H. Goodwin, Shri Chimanlal B. Parikh, Shri F. B. Loxmeshwar, Dr. B. N. Uppal; Mr. A. Mueller and Shri Bhawanji A Khimji.

AGRICULTURAL RESEARCH SUB-COMMITTEE.

- I. *The President* —Sardar Datar Singh (*ex-officio*)
- II. *The Vice-President.*—Shri R. G. Saraiya (*ex-officio*).
- III. *Co-operative Banking Representative.*—Shri R. G. Saraiya.
- IV. *Cotton Growers' Representatives:*—Sardar Ujjal Singh,
Shri S. K. Wankhede and Shri P. S. Patil.
- V. *Cotton Trade Representatives:*—Shri Madanmohan R. Ruia
Shri Chunilal B. Mehta, Mr. A. Mueller, Mr. L. F. H. Goodwin and
Shri Kisanlal Goenka.

VI. Agricultural Officers:—The Agricultural Commissioner with the Government of India (*ex-officio*); Mr. D. N. Mahta; Shri M. S. Sivaraman; Dr. B. N. Uppal; Dr. S. B. Singh; Dr. R. J. Kalamkar; Shri N. M. Deshmukh; Dr. Gursham Singh; Shri B. S. Sawhney; The Economic Botanist, Bihar; The Economic Botanist, Orissa; Dr. T. S. Sabnis and Dr. L. S. Doraswamy.

VII. Additional Members:—Pandit Thakurdas Bhargava; Shri F. B. Loxmeshwar; Shri R. Balasubramania Ayyar; Shri S. S. Pande; Shri G. B. Patel; Prof. R. H. Dastur; Dr. V. G. Panse; Dr. S. M. Sikka; Dr. S. R. Barooah; Dr. C. Nanjundayya and Shri S. R. Rane.

VIII. The Secretary, Indian Central Cotton Committee, (*ex-officio*).

TECHNOLOGICAL RESEARCH SUB-COMMITTEE.

The President, Sardar Datar Singh *ex-officio*; *The Vice-President* Shri R. G. Saraiya (*ex-officio*); The Agricultural Commissioner with the Government of India *ex-officio*; Shri Madanmohan R. Ruia; Shri Vithal N. Chandavarkar; Shri Chunilal B. Mehta; Mr. Neville Wadia; Mr. A. Mueller; Mr. Chimanlal B. Parikh; Mr. D. N. Mahta; Mr. L. F. H. Goodwin; Dr. B. N. Uppal; Shri M. S. Sivaraman; Shri Kisanlal Goenka; Dr. R. J. Kalamkar; Shri B. S. Sawhney; Shri R. V. Deshmukh and Shri J. K. Srivastava; Shri R. Balasubramania Ayyar; Shri P. S. Patil; Dr. G. M. Nabar; The Director of Industries, Bombay; The Principal, Victoria Jubilee Technical Institute, Bombay; Shri S. S. Pande; Dr. V. G. Panse; Dr. C. Nanjundayya (Director, Technological Laboratory); Shri G. B. Patel; Shri Pratap Bhogilal and Shri B. D. Kulkarni; (Representing the Bombay Millowners' Association), Shri Rasiklal C. Nagri and Shri Chinubhai Naranbhai (Representing the Ahmedabad Millowners' Association), Shri Ramji Rawji and Shri Jamnadas Ramdas; (Representing the East India Cotton Association) and Dr. L. Thoria (Representative of the Council of Scientific and Industrial Research).

COTTON FORECAST SUB-COMMITTEE.

The President, Sardar Datar Singh (*ex-officio*); *The Vice-President*, Shri R. G. Saraiya; The Agricultural Commissioner with the Government of India (*ex-officio*); The Director General of Commercial Intelligence & Statistics; Dr. V. K. R. V. Rao; The Director of Agriculture, Bombay State; The Director of Agriculture, Madras State; The Director of Agriculture, Uttar Pradesh; The Director of Agriculture, Madhya Pradesh; The Director of Agriculture, Punjab; Shri Chunilal B. Mehta; The Director of Land Records, Madhya Pradesh; Mr. D. N. Mahta; Mr. A. Mueller and Dr. V. G. Panse; The Director of Statistics Hyderabad Dn; The Economical and Statistical Adviser to the Government of India, Ministry of Food & Agriculture (Agriculture); The Economic Adviser and Joint Secretary to the Government of Madras Public (Economics & Statistics) Department, Madras.

COTTON GINNING AND PRESSING FACTORIES SUB-COMMITTEE.

The President, Sardar Datar Singh; *The Vice-President*, Shri R. G. Saraiya (*ex-officio*); Shri Chunilal B. Mehta; Shri Madanmohan R. Ruia; Shri Vithal N. Chandavarkar; Mr. A. Mueller; Mr. L. F. H. Goodwin; Shri C. M. Kothari; Shri Kundanlal Dr. B. N. Uppal; Shri J. K. Srivastava; Shri R. V. Deshmukh, Shri Bhawanji A. Khimji; Dr. C. Nanjundayya and Shri S. S. Pande.

EXPERT SUB COMMITTEE TO FILL TECHNICAL POSTS UNDER THE INDIAN CENTRAL COTTON COMMITTEE.

The President, The Vice-President, The Director of Agriculture, Bombay state and The Secretary.

APPENDIX III

Statement of Receipts and Expenditure for the year ended 31st March, 1951.

RECEIPTS.			EXPENDITURE		
	Rs.	as. ps.		Rs.	as. ps.
Opening Balance as on 1st April 1950 ...	40,49,558	13 0	<i>Administration of the Committee :-</i>		
Receipts under section 12 of the Indian Cotton Cess Act 1923 ...	7,43,329	5 6	(including Improvement of Cotton Marketing, Printing, Publicity and Distribution and Travelling Allowance of Non-Official Members) ...	3,00,122	11 5
Amount received from the Cotton Fund ...	21,18,308	13 9	<i>Agricultural Research Grants-in-aid :-</i>		
Other Receipts ...	1,54,377	1 7	(including Research, Seed, Marketing and Miscellaneous Schemes) ...	8,12,127	4 1
			Technological Research ...	3,41,546	6 10
			<i>Closing Balance :-</i>		
			Govt. Securities & Corporation Bonds ..	41,07,000	14 0
			Imprests ...	5,200	0 0
			Suspense : (Recoverable) ...	48,690	5 1
			Balance in Imperial Bank of India current account ..	14,50,886	8 5
Total Rs. ...	70,65,574	1 10	Total Closing Balance ...	56,11,777	11 6
			Total Rs. ...	70,65,574	1 10

65th Meeting of the Indian Central Cotton Committee



**THIRTY-FIRST
ANNUAL REPORT**

of the

**INDIAN
CENTRAL COTTON COMMITTEE**

for the year ended

31st AUGUST,

1952

PRICE Rs. 2

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INDIAN CENTRAL COTTON COMMITTEE

ANNUAL REPORT

CHAPTER I

GENERAL

THIS is the thirty-first Annual Report, covering the period 1st September, 1951 to 31st August, 1952, of the Indian Central Cotton Committee which was established by the Government of India in 1921, in pursuance of the recommendations of the Indian Cotton Committee of 1917-18. During the first two years, the Committee was a purely advisory body to Government on matters connected with cotton. In 1923, however, it was incorporated under the Indian Cotton Cess Act and provided with separate funds to enable it to undertake work for the improvement of the growing, marketing and manufacture of cotton in India. These funds are derived from the levy of a cess on all cottons consumed in mills in India or exported from Indian ports. After the passing of the Act, the cess was collected for the first three years at the rate of annas four for every bale of Indian cotton consumed in Indian mills or exported, and thereafter at the rate of annas two per bale. During the years preceding the World War II, the annual income of the Committee from this source was about Rs. 7 lakhs.* Subsequently, however, as a result of heavy decline in exports during the War, the receipts from the Cotton Cess dropped considerably and the income of the Committee was further reduced by the partition of the country in August, 1947, as a consequence of which the cess on exports of cotton from Pakistan, as also on cotton consumed in Pakistan mills, was lost to the Committee. This loss of income was made good to some extent by grants given by the Government of India from the Cotton Fund which had been built from the proceeds of the levy of an additional duty of one anna per lb. on all imports of raw cotton. In order to provide a more assured and adequate income to the Committee to carry out its work and policy effectively, two successive amendments of the Indian Cotton Cess Act, were carried out in 1947

* One lakh = one hundred thousands.

and 1948, whereby the cess was made leviable on all cotton consumed in Indian mills, or exported from India, with effect from 15th August, 1947, and its rate was raised from two annas per bale to four annas per bale from the 10th September, 1948. Further, from the 1st April, 1951, the provisions of the Indian Cotton Cess Act were extended to Part B† States as well, they previously being applicable to Parts A‡ and C§ States only.

During the thirty years of its existence, the Indian Central Cotton Committee has provided a common meeting ground for all sections of the cotton industry and the Agricultural Departments of the cotton growing States in India, at which the cotton problems of the country have been discussed and measures for dealing with them suggested. In the discharge of its functions, the Committee has always adhered to its original principle, viz., the cotton growers' interests must be paramount in all matters considered by it.

The first task of the Committee was to initiate a well-directed co-ordinated effort for the improvement of cotton in India from every aspect, including the improvement of the race of the plant by scientific breeding. Grants were made to Departments of Agriculture in the various cotton growing States for specific investigations on cotton in which improvement of the variety was naturally given a high priority. It has been the general policy of the Committee to supplement and not supplant the work of the State Departments of Agriculture, and though, as a matter of convenience, certain lines of demarcation have been laid down regarding the investigations which the Committee considers most appropriate for its grants, assistance, as a general rule, is given for studies and extension work that are most needed.

The Cotton Cess (Amendment) Act of 1948, provided for the representation on the Committee of some of the newly integrated States in which cotton is an important crop. A list of members of the Committee indicating

† Part B States—Hyderabad, Jammu and Kashmir, Madhya Bharat, Mysore, Pepsu, Rajasthan, Saurashtra and Travancore-Cochin.

‡ Part A States—Assam, Bihar, Bombay, Madhya Pradesh, Madras, Orissa, Punjab, Uttar Pradesh and West Bengal.

§ Part C States—Ajmer, Bhopal, Bilaspur, Coorg, Delhi, Himachal Pradesh, Cutch, Manipur, Tripura, Vindhya Pradesh and Andaman and Nicobar Islands.

the various interest they represented, as on the 31st August, 1952, is given in the Appendix I. The names of members of the various Sub-Committees are shown in Appendix II. The functions of these Sub-Committees have been described in earlier reports of the Committee. Under the Indian Cotton Cess Rules, members, other than *ex-officio* members; hold office for three years, and one-third of their number retire each year in rotation. The term of office of additional members appointed by the Central Government under Section 4(x) of the Indian Cotton Cess Act is three years or such shorter period as may be specified in the notification appointing them.

During the year under review, the post of Secretary of the Committee was held by Shri Kalidas Sawhney and that of Assistant Secretary by Shri C. J. Bocarro. The temporary post of Deputy Secretary, which was created in 1950, to cope with the rapidly expanding work of the Committee was extended upto the 31st March, 1953, and Shri P. D. Gadkari continued to hold the post throughout the year.

The total receipts of the Committee since its inception in 1923, to the 31st March, 1952, amount to Rs. 3,22,21,967-10-2, of which Rs. 2,42,12,503-12-5 represent collections from the Cotton Cess and miscellaneous receipts and the remainder, special grants from the Government of India. The receipts during the financial year 1951-52 amounted to Rs. 11,62,448-8-4, the total expenditure being Rs. 15,32,507-10-3. A statement of receipts and expenditure for the year ending 31st March, 1952, is given in Appendix III.

Sardar Datar Singh (President), Shri Chimanlal B. Parikh (Vice-President), Shri R. G. Saraiya, Dr. B. N. Uppal, Shri S. K. Wankhede and the Secretary represented the Committee on the Board of Governors of the Institute of Plant Industry, Indore, during the financial year ending 31st March, 1952. During the same period, Shri Chunilal B. Mehta, represented the Committee on the Indian Council of Agricultural Research. He was also appointed as the Committee's representative on the Administrative Council of the Empire Cotton Growing Corporation for the period ending 31st May, 1952. Under article 51 of the Articles of Association of the East India Cotton Association, the Indian Central Cotton Committee is entitled to nominate from amongst its growers' representatives, three persons, not having dealings in forward contracts, as Directors of the Association.

Lala Basant Lal Agarwal, Shri S. R. Rane and Shri P. S. Patil worked in this capacity during the cotton year 1951-52.

Two meetings of the Indian Central Cotton Committee were held in the year under report at which Sardar Datar Singh, President of the Committee and Vice-President of the Indian Council of Agricultural Research, presided. The first meeting was held on the 3rd and 4th March, 1952, and the second on the 11th July, 1952.

At its meeting held in March, 1952, the Committee considered the question of fixation of maximum and minimum prices of cotton for 1951-52 season. The Committee had before it also a note by one of its members giving his views on the cotton price policy for 1951-52 and 1952-53. After a full discussion, the Committee passed the following resolution by a majority :—

RESOLUTION :—

“The Committee regrets to note that the quotas of Indian Cotton allowed to the textile mills not having been lifted promptly in some parts of the country, difficulty is experienced by the cotton growers in disposing of their produce and the price of cotton has come down in up-country markets by 10 to 15 per cent. It is apprehended that if immediate steps are not taken to remedy this position the “Grow-more-cotton” campaign will be affected adversely.

In view of the financial difficulties that the textile mills are experiencing due to the locking up of huge capital in the purchase of imported American cotton, the Cotton Committee recommends that the Reserve Bank of India should extend credit facilities through the scheduled and co-operative banks to the purchasers of Indian Cotton. At the same time a time limit should be enforced for the lifting of quotas by the textile mills and the middlemen should be freely allowed to trade in cotton within the ceiling prices, the distinction in respect of A, B and C class licencees being abolished.

With a view to maintaining the price of cotton, the Committee also suggests that the fixation of revised prices of cloth and yarn manufactured from Indian cotton should be half-yearly (or annually) instead of quarterly as at present.

Although it is too early to fix a price for the 1952-53 crop, yet, the Committee urges that the price of cotton for the next season should be stabilised at the present level. Furthermore, in order to encourage the production of better quality cotton in India, the prices of improved varieties should be fixed at a suitable level with full premia for longer staples and better grades and the prices of yarn and cloth manufactured from those improved varieties should be determined in accordance with the prices so fixed.

Immediate steps should be taken to remove transport difficulties in respect of the large quantities of pressed cotton now lying unsold in the up-country markets.

Finally, the Committee recommends that in fixing the cotton import and export policy of the Government, the interests of the growers should be specially safeguarded and for this purpose, the effects of this year's large imports of foreign cotton on the production of indigenous cotton should be carefully watched. Not only this, but also the campaign for growing better quality cottons in India should be intensified, so that the imports of long staple foreign cotton may be minimised."

The above resolution was forwarded to the Government of India and suitable steps were taken by them to relieve the situation.

The Committee also considered the subject of planned production of cotton and the progress made in the cotton extension work during 1951-52 season and plans for 1952-53 and unanimously passed the following resolution :—

"The Cotton Committee notes with satisfaction that as a result of the "Grow-more-cotton" campaign undertaken by the Central and State Governments, the production of Indian cotton has increased from 29 lakhs bales in 1949-50 to about 37 lakhs bales in 1951-52. The Committee also welcomes the plan to produce about 39 lakhs bales in ensuing year 1952-53.

The Committee desires to point out that the stage will be reached by 1952-53 when further diversion of land from food crops to cotton and other cash crops will have a serious effect on the country's food supplies. The workable distribution of available acreage in 1952-53 for cotton must, therefore, be accepted as the basic allocation. The Committee is of the view that further increase in the production of Indian cotton to reach the target of 45 lakh bales in 1956 as proposed by the Planning Commission should be achieved mainly through land transformation and intensive cultivation. Accordingly, the Committee recommends that—

- (i) the cultivation of improved varieties of cotton should be extended to all such areas where improved seed is not being sown at present, and adequate plant protection measures should be taken.
- (ii) all the area growing irrigated cotton should be suitably manured to increase the yield per acre.
- (iii) out of the 14 million acres now growing unirrigated cotton, about 3 million acres should be provided with irrigation facilities by constructing minor irrigation works and such other measures as are feasible, and
- (iv) the Government of India should provide the fertilisers and funds required for securing irrigation facilities expeditiously."

The above resolution was communicated to the Government of India and they have addressed the State Governments for taking such action as might be deemed necessary.

At its meeting in July, 1952, the Committee considered the question of fixation of maximum and minimum prices of cotton for the 1952-53 season and passed the following resolution :—

RESOLUTION :—

“The meeting of the Indian Central Cotton Committee recommends to the Government of India to fix floor prices for varieties of cotton for which floors are not fixed at present”.

The resolution was forwarded to the Government of India but it was not accepted.

The Committee also considered the question of the proposed levy by the Government of Bombay of Sales Tax on cotton and unanimously passed the following resolution :—

RESOLUTION :—

“In view of the fact that

- (i) cloth is already subjected to Sales Tax in Bombay, and imposition of the Sales Tax on cotton would constitute double taxation,
- (ii) cotton and cotton seed have been included in the Schedule of goods declared as essential for the life of the community in the Government Bill now before the Central Parliament and that, therefore, the spirit of the Constitution requires postponement of all action by State Legislatures on the inclusion of cotton and cotton seed under the Sales Tax,
- (iii) the Indian Central Cotton Committee had already declared themselves unanimously against the inclusion of cotton and cotton seed under the Sales Tax in August, 1946 and that, following their resolution the then Government of Bombay had omitted cotton and cotton seed from the scope of the Sales Tax, and
- (iv) the proposal by the Government of Bombay to levy the Sales Tax on cotton would adversely affect the interests of the cotton grower both in Bombay State and in the rest of India, this meeting of the Indian Central Cotton Committee requests the Government of Bombay to postpone the inclusion of cotton in the Schedule of items to which they propose to apply the Sales Tax and also requests the Government of India to intervene with the Government of Bombay in this matter. The Committee also requests other State Governments not to levy the Sales Tax on raw cotton”.

The resolution was forwarded to the Government of Bombay and other State Governments for necessary action.

The Fifth Conference on Cotton Growing Problems in India was held on the 4th, 5th and 6th March, 1952, in the Committee's office and was attended by workers from the different parts of the country. Two symposia one on "cotton extension work" and the other on "the growth of perennial cottons in India" were held in conjunction with the Conference.

CHAPTER II

COTTON STATISTICS

(i) Area and production

Bombay, Madhya Pradesh, Madras, Hyderabad, Punjab, Pepsu, Madhya Bharat, Saurashtra, Rajasthan, Mysore, Uttar Pradesh and Assam constitute the major cotton producing States of the country.

The total area under cotton in 1951-52 was 16.21 million acres, as against 14.56 million acres (revised) in the previous year. The increase in area during the year under review by 11.4 per cent. over that in last year was largely due to the 'Grow More Cotton' Campaign which was continued for the 2nd year. This increase of acreage was of a larger magnitude in the States of Bombay, Madhya Pradesh and Hyderabad, and to a moderate extent in the States of Madras, Punjab, Uttar Pradesh, Mysore and Pepsu. There was, on the other hand, a considerable decline in the area under cotton in the States of Madhya Bharat and Saurashtra due to deficient rains at sowing time. Of the total area, some 12.9 lakh acres were under the irrigated crop in 1951-52 against 10.9 lakh acres in the previous year.

The production of cotton in 1951-52 was officially estimated at 31.34 lakh bales of 392 lbs. each, against 29.71 lakh bales (revised) in the previous year. The estimate of a commercial firm was, however, 38.93 lakh bales, against 33.34 lakh bales in 1950-51. The States of Madhya Pradesh and Hyderabad contributed in large measure to the increase in production, due to exceptionally favourable seasonal conditions, and the States of Madras, Punjab and Mysore, to slight extent. The States of Bombay and Saurashtra, on the other hand, showed a heavy decline in the production as compared with that of last year due to deficient rains and adverse weather conditions. The States of Madhya Bharat, Pepsu and Rajasthan also contributed to the decrease owing to unfavourable climatic conditions. The overall production of cotton in the country showed an increase of 5.5 per cent., as compared with that in 1950-51.

The area and production of the different varieties of cotton in 1951-52, as per official estimates were as under :—

Variety	Area (thousand acres)	Production (thousand bales of 392 lbs. each)
BENGALS		
U. P. Deshi	232	68
Punjab Deshi	588	274
Rajputana Deshi	336	74
TOTAL	1,156	416
AMERICANS		
Punjab Americans	227	121
Hyderabad Americans	317	64
American Parbhani	3	1
Bur	363	93
TOTAL	910	279
OOMRAS		
C. P. Oomras*	894	216
Berat Oomras*	303	75
Nimar Oomras*	61	12
Jarilla	2,050	447
Madhya Pradesh Verum	282	66
Khandesh Oomras	5	2
Barsi Nagar Oomras	118	28
Hyderabad Oomras	790	127
TOTAL	4,503	973
HYDERABAD GAORANI	1,000	168
CENTRAL INDIA		
Malvi	745	96
C. I. Others	742	99
TOTAL	1,487	195
BROACH	902	125
SURTI	407	56

(Contd.)

* Estimated.

Variety	Area (thousand acres)	Production (thousand bales of 392 lbs. each)
DHOLLERAS		
Gujarat Dholleras	825	104
Kathiawar Dholleras	759	86
Kathiawar Short Staple	176	16
Kutch Dholleras	20	3
TOTAL	1,780	209
SOUTHERNS		
Kumta and Upland	1,547	205
Bijapur and Bagalkot Jowari	476	55
Westerns	974	113
White and Red Northern	118	15
Warangal and Coconadas	76	13
Chinnapathi Short Staple	5	(a)
TOTAL	3,196	401
TINNEVELLIES	508	135
CAMBODIA	286	150
SALEM	23	5
COMILLAS	55	22
GRAND TOTAL	16,213	3,134

(a) Less than 500 bales.

In view of the changes that had taken place in the character of the Indian cotton crop in recent years, the Indian Central Cotton Committee in March, 1952, revised the classification of cotton for adoption in the all-India cotton forecasts. This is under consideration of the Government of India.

(ii) Staple length of Indian Cotton

A report on the staple length of Indian cotton crop is published by the Committee in the form of a leaflet during each season. The crop of 1951-52 classified according to the different staple length groups, as compared with that in the previous season is indicated below :—

Staple length groups.	Cotton production	
	1951-52 (in thousand bales of 392 lbs. each)	1950-51
Superior long staple (1" and above)	47 (2)	47 (2)
Long staple (7/8" to 31/32")	872 (28)	637 (21)
Superior medium staple (13/16" and 27/32")	792 (25)	793 (27)
Medium staple (below 13/16" and above 11/16")	439 (14)	655 (22)
Short staple (11/16" and below)	984 (31)	839 (28)
Total	3,134	2,971

N B. Figures in brackets represent percentages to total

(iii) Statistics of cotton pressed

The figures of cotton pressed during the year under review in the different States of the Indian Union, as compared with the previous year, are shown below :—

States.	Cotton pressed	
	1951-52 (in thousand running bales).	1950-51
Bombay	750	724
Madras	207	206
Madhya Pradesh	981	598
Punjab	229	153
Uttar Pradesh	1	-
West Bengal	8	8
Assam	3	5
Total Part A States	2,179	1,694
Hyderabad	461	306
Pepsu	226	170
Madhya Bharat	242	60*
Saurashtra	88	202
Rajasthan	82	93
Mysore	17	21
Total Part B States	1,116	852
Ajmer	8	12
Bhopal	6	3
Kutch	1	4
Total Part C States	15	19
Grand Total Indian Union	3,310	2,565

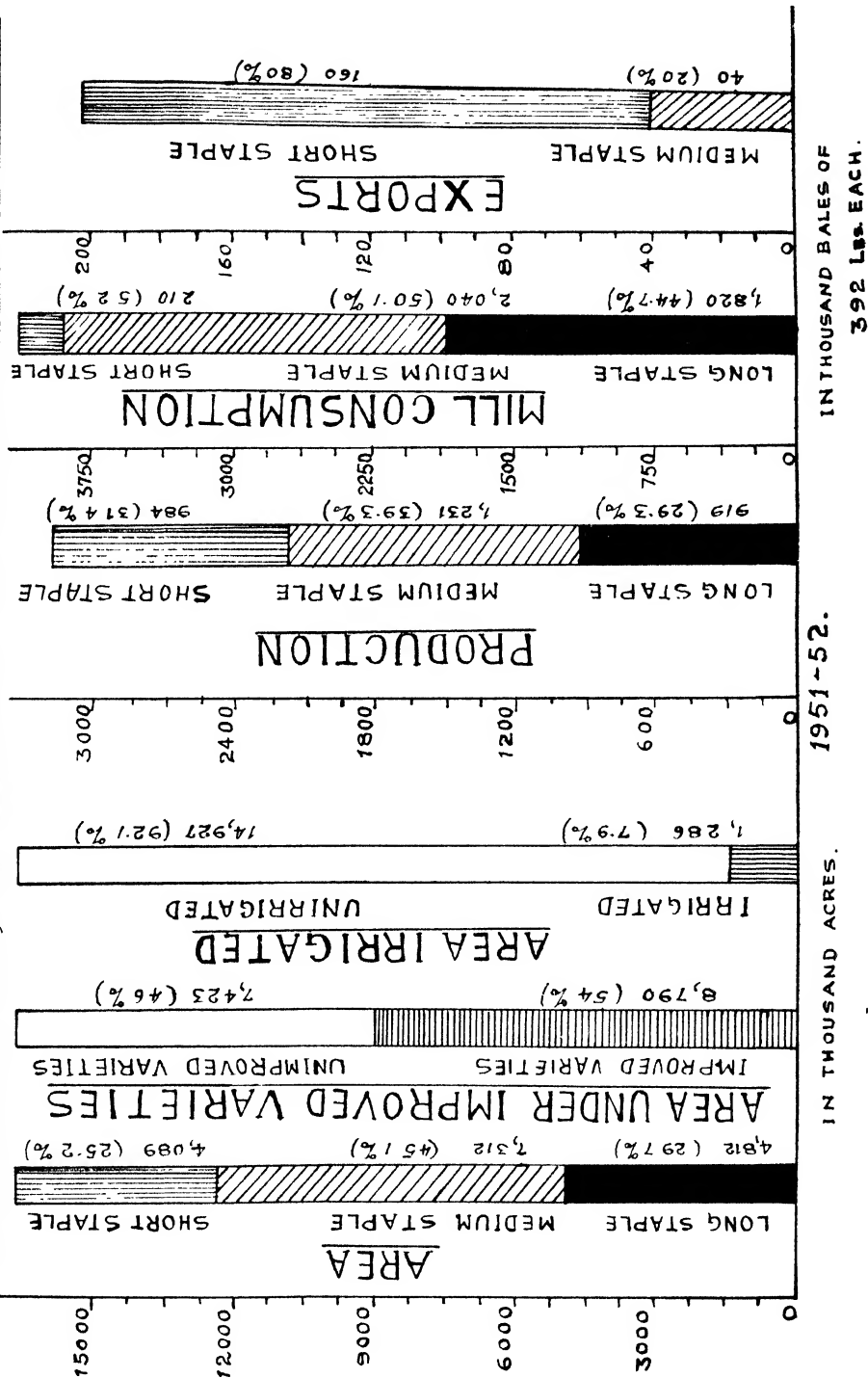
* Incomplete.

(iv) Cotton Supply Position

The position regarding supply and distribution of cotton during the year under review is summarised below :—

	7/8" and above	Below 7/8" and above 11/16"	11/16" and below	Total
(In lakhs of bales of 392 lbs. each).				
SUPPLY				
1. Estimated carry-over at the commencement of the season, i.e., on 1st September 1951				
(a) <i>With mills</i>				
Indian Cotton	3.0	8.4	1.0	12.4
Foreign Cotton	3.0	-	-	3.0
(b) <i>With trade</i>				
Indian Cotton	0.2	1.0	1.0	2.2
Foreign Cotton	0.6	-	-	0.6
TOTAL	6.8	9.4	2.0	18.2
2. Production of Indian Cotton in 1951-52	8.9	22.9	7.1	38.9
3. Imports from foreign countries	12.4	-	-	12.4
TOTAL SUPPLY	28.1	32.3	9.1	69.5
OFFTAKE				
4. <i>Mill Consumption :—</i>				
Indian Cotton	10.8	-	-	10.8
Foreign Cotton	7.4	20.4	2.1	29.9
	18.2	20.4	2.1	40.7
5. Extra-factory consumption		0.4	2.3	2.7
6. Exports	-	0.4	1.6	2.0
TOTAL OFFTAKE	18.2	21.2	6.0	45.4
7. Estimated carry-over at the end of the season, i.e., on 31st August 1952.				
(a) <i>With mills</i>				
Indian Cotton	3.5	8.0	1.1	12.6
Foreign Cotton	3.9	-	-	3.9
(b) <i>With trade</i>				
Indian Cotton	1.2	3.1	2.0	6.3
Foreign Cotton	1.3	-	-	1.3
TOTAL	9.9	11.1	3.1	24.1

INDIAN UNION AREA, PRODUCTION, MILL CONSUMPTION AND EXPORTS OF COTTON.



(v) Imports

Besides Indian cotton, mills also utilise foreign cotton. The imports of such cotton into the Indian Union during the year under review as compared with those in the previous two seasons are shown below :—

Countries	Cotton imported during		
	1951-52	1950-51	1949-50
	(In thousand bales of 392 lbs. each)		
Egypt	147	253	349
East Africa	135	217	288
Anglo-Egyptian Sudan	53	72	63
U. S. A.	890	265	493
Peru	10	13	42
Other countries	5	11	17
Total	1,240	831	1,252

(vi) Mill consumption

Statistics of cotton consumed in mills in Part A and C States of the Indian Union are collected under the Indian Cotton Cess Act, 1923. Similar statistics for Part B States are collected on a voluntary basis for the present and the question of collection of these statistics under the above Act which has now been made applicable to these States is under the consideration of the authorities concerned.

The mill consumption of cotton (both pressed and unpressed) in 1951-52, as compared with that in the previous 2 seasons was as follows :—

States	1951-52			1950-51			1949-50		
	Indian cotton	Foreign cotton	Total	Indian cotton	Foreign cotton	Total	Indian cotton	Foreign cotton	Total
	(in thousand bales of 392 lbs. each).								
Part A States	2,241	1,071	3,312	1,850	1,083	2,933	1,929	1,086	3,015
Part B States	535	49	584	509	48	557	499	52	551
Part C States	166	14	180	142	17	159	142	22	164
Total Indian Union	2,942	1,134	4,076	2,501	1,148	3,649	2,570	1,160	3,730

Mills situated near cotton growing areas often use considerable quantities of ginned but unpressed cotton. Mill consumption of such loose cotton in 1951-52, as compared with the previous two seasons is shown below :—

States	Unpressed (loose) Indian cotton consumed in mills		
	1951-52	1950-51	1949-50
(In thousand bales of 392 lbs. each).			
Part A States	184	174	211
Part B States	64	57	65
Part C States	12	12	10
Total Indian Union.	260	243	286

(vii) *Demand for various types of cotton in India*

Statistics relating to receipts at mills are collected during each season on a voluntary basis direct from mills and published by the Committee for general information. During the year under review, the receipts at mills of Indian cotton were 30.13 lakh bales of which 28, 62 and 10 percent were long, medium and short staple cotton.

Simultaneously, the statistics of receipts of foreign cotton were also collected. Such receipts for the year 1951-52, together with those for the previous two seasons, were as follows :—

Foreign cotton	Receipts at mills (in thousand bales of 392 lbs. each)		
	1951-52	1950-51	1949-50
Pakistan Cotton	10	36	106
American (U. S. A. and others)	884	371	447
Egyptian	149	268	391
East African	133	204	288
Sudan	55	77	48
Others (Afghan, Burma, etc.)	4		
TOTAL	1,235	956	1,280

(viii) Exports

Statistics of exports of the different varieties of Indian cotton are collected annually from the exporters on a voluntary basis. The exports during the year under review as compared with those in the previous two seasons were as follows :—

Countries	Quantity Exported		
	1951-52	1950-51	1949-50
	(In thousand bales of 392 lbs. each).		
U. K	10.0 (5)	28.0 (15)	12.2 (5)
U. S. A.	13.4 (7)	72.7 (40)	62.8 (28)
Continent of Europe	52.3 (26)	21.9 (12)	89.3 (40)
Other Countries	124.2 (62)	61.7 (33)	58.3 (27)
TOTAL	199.9	184.3	222.6

(ix) Statistics of stocks of cotton held in the country.

Statistics of stocks of cotton held by the mills on the 31st August each year are collected by the Committee on a voluntary basis, and those held by the trade through the co-operation of the State authorities and trade bodies. The Governments of Bombay, Madhya Pradesh, Uttar Pradesh, Punjab and Hyderabad have passed the necessary legislation for the collection of the figures of stocks held by the trade on a compulsory basis with a view to making them as complete as possible.

The stocks held by the mills on the 31st August, 1951, were 11.14 lakh bales of Indian cotton and 2.80 lakh bales of foreign cotton, and those held by the trade were 3.73 lakh bales of Indian cotton. Of the stocks of Indian cotton held by the mills, long, medium and short staple cotton formed 23, 69 and 8 per cent. respectively.

(x) Cotton Control

The controls over prices, movement and distribution of raw cotton were continued during the 1951-52 season. The zonal scheme for equitable distribution of Indian cotton to textile mills was also continued in modified form. Towards the middle of June 1951, the Government of India announced the cotton policy for 1951-52, raising the **basic ceiling prices** of Jarilla

N. B.—Figures in brackets represent percentages to total.

—Exports were mainly of short staple cotton.

by Rs. 50 per candy, and of other varieties by varying amounts ranging from Rs. 30 to Rs. 90 per candy over the prices fixed for them in 1950-51. In the absence of any machinery for checking the qualities and varieties of cotton offered for sale, the bulk of the crop in 1950-51 had been sold at top ceiling rates (rates for the highest grade and staple) irrespective of quality. This position resulted in large scale mixing of different varieties. Accordingly, quality control scheme was put into operation for the 1951-52 crop to remedy the evil. Under this scheme, the crop of each variety was assessed at reasonable intervals as and when it moved and the average quality of the crop and the prices thereof in terms of the Cotton Control Order were declared. The assessment of quality was done by an Expert Committee appointed for the purpose. While transactions put through at prices fixed for the average quality were not subject to any further survey, claims for premium were accepted only after the particular consignments had been surveyed and a certificate from the Sworn Surveyors of the East India Cotton Association obtained. The scheme provided for an appeal to the Expert Committee against the award of the Sworn Surveyors. In order to give an incentive to the increased production of long staple cotton, during the year, six improved varieties of such cotton were excluded from price control if they satisfied certain conditions regarding purity. Suitable special premia over the basic maximum prices were also allowed in the cases of many other improved varieties of cotton grown in areas reserved by the State Agricultural Departments for the purpose of procuring pure seed for sowing purposes.

The new system of cotton trading introduced in 1951-52, provided for 3 classes of licensees, viz., 'A', 'B', and 'C', based on the extent of business carried on by licensees during the previous five seasons.

As a result of the large imports of American cotton involving huge financial commitments on the part of mills, the marketing of Indian cotton was affected adversely. Many of the textile mills found it difficult to finance the purchase of indigenous cotton against the quotas allotted to them by Government. Consequently, the demand for Indian cotton in many parts of the country dwindled a great deal and their prices fell much below those fixed for average qualities. In some markets farmers were forced to resort to distress selling.

The complaints that the textile mills were not lifting promptly the quotas of Indian cotton allotted to them in various zones, together with other problems, were considered by the Indian Central Cotton Committee at its meeting in March, 1952. As a result, the Committee recommended that (i) The Reserve Bank of India should extend credit facilities through the scheduled and co-operative banks to encourage the purchase of Indian cotton; (ii) A time limit should be enforced for the lifting of quotas by the textile mills; (iii) The middlemen should be freely allowed to trade in cotton within the ceiling price, the distinction in respect of A, B and C class licensees being abolished; (iv) The fixation of revised prices of cloth and yarn manufactured from Indian cotton should be half yearly or annually, instead of quarterly; (v) The price of cotton for the next season should be stabilised at the prevailing level and the prices of improved varieties should be fixed at a suitable level with full premia for longer staples and better grades; (vi) Transport difficulties in respect of the large quantities of pressed cotton lying unsold in the upcountry markets should be removed and (vii) The interests of the growers should be specifically safeguarded while fixing the cotton import and export policy of the Government.

The Government of India were addressed in the matter. In order to arrest the sharp fall in the prices of Indian cotton in general and of Bengal Deshi cotton in particular, the Government of India reduced from the 16th March, 1952, the export duty on raw cotton from Rs. 400 to Rs. 200 per bale and also made certain temporary relaxation in the Cotton Control Order. Cotton growers were permitted to gin, press, and sell their cotton to mills without obtaining a licence under the Order. The Government of India also guaranteed to purchase the American and East African cottons at fixed floor prices should the banks find it necessary in the ordinary course of business to sell the same for realising the loans advanced by them against such cotton. The Government also announced that they would support the floor prices of Indian cotton by purchases at such levels. As a result of the above measures, the prices of Indian cotton had rallied to some extent.

The Indian Central Cotton Committee at its meeting in July, 1952, considered the question of fixation of maximum and minimum prices of Indian cotton for the 1952-53 season, and recommended that the Government of India be requested to fix floor prices for varieties of cotton for which floors

were not fixed during the 1951-52 season. This recommendation was, however, not accepted.

(xi) Improvement of cotton forecasts

The all-India cotton forecasts of 1950-51 season were subjected to the usual post-mortem examination by the Cotton Forecast Sub-Committee, with a view to detect the extent of error in the final official forecasts. As a result of this scrutiny, the actual crop for the season was estimated to be about 3,282,000 bales against the official forecast of 2,926,000 bales subsequently revised to 2,971,000 bales, the latter being short of the actual crop by 10.8%. The discrepancy was mainly in the forecasts for the States of Madhya Pradesh, Bombay, Saurashtra, Rajasthan and Ajmer,

The Committee considered and agreed to a proposal received from the Government of India to change the date of issue of the fifth all-India official forecast on cotton from 15th of April to 10th of May, so that this final forecast could incorporate the estimates obtained from the crop estimating survey conducted in the State of Bombay.

(xii) Crop estimating surveys on cotton

The method of estimating the average yield of kapas (seed cotton) per acre, by conducting random sample harvests, is now being followed for arriving at the final forecasts of production in the States of Madhya Pradesh and Bombay as an annual routine in place of the former practice of basing the yield forecasts on annawari estimates of the revenue officials. The third and fourth forecasts on cotton, however, continue to be based on the old system. Nevertheless, the standard normal outturns assumed for each district are being revised every year on the basis of the more accurate estimates now obtained from the crop estimating surveys.

During the 1951-52 season, the survey in Madhya Pradesh covered an area of 3,000,743 acres, i.e., 99.34% of the total cotton growing area in the State. The total production of cotton lint in the State based on the results of the survey was 687,467 bales with a marginal error of 133,160 bales. In Bombay State, the survey in the current year was extended to seven districts and 4 talukas in addition to the 12 major cotton growing districts covered during the previous year. The area thus covered was 3,584,298 acres and the total production of cotton lint was estimated at 485,897 bales.

The question of instituting similar random sample surveys in the other major cotton growing States also has been engaging the attention of the Committee. A scheme for conducting crop estimating surveys of cotton in the State of Punjab was considered and approved by the Committee in April, 1952. It also sanctioned a small Central staff with the Indian Council of Agricultural Research to co-ordinate and supervise the work on these surveys conducted in several States.

The Cotton Forecast Sub-Committee while considering the reports on these crop estimating surveys, noted that the estimates of production for the States arrived at by them were much too low as compared to the production reported by the Trade agencies. It was pointed out that the under-estimation during the current year was due, on the one hand, to the correct acreage figures not being available at the time of preparation of the report, and lack of provision of adequate supervision of field work on the other. The Committee, however, appointed a Special Sub-Committee to go into the whole question and to suggest suitable measures to ensure the accuracy of the official estimates. The Special Sub-Committee's recommendations are receiving attention of the concerned authorities of the Government of India.

(xiii) Cost of production surveys on cotton

The pilot scheme sanctioned by the Committee in April, 1950, to collect statistical data on the materials used and labour employed for the cultivation of cotton and rotation crops in Akola district on a random samples basis, was put into operation in April, 1952. After a careful study of the data thus collected, it would be possible to suggest suitable designs on which lines comprehensive surveys can be carried out to estimate the actual cost of production of any crop in any specified area.

(xiv) Prices and arrivals of cotton in up-country markets

Data relating to the arrivals and prices of kapas in the up-country markets continued to be collected during the 1951-52 season. Summarised weekly statements were prepared and circulated to interested organisations.

(xv) Supply of monthly reports on Indian cotton to the International Cotton Advisory Committee

During the year, the Committee's office supplied, as usual, monthly reports on Indian cotton to the International Cotton Advisory Committee,

Washington. These covered items such as stocks held by mills, imports of foreign cotton, consumption of cotton in spinning mills, exports of Indian cotton, crop estimates and pressings, cotton prices, inland despatches by rail of cotton piecegoods and their export, index number of wholesale prices and policy of the Government of India affecting raw cotton and cotton manufactures as announced from time to time.

(xvi) Publications

The following Statistical Publications were issued during the year :—

- (i) Statistical Leaflet No. 1 (Eighteenth issue 1950-51) entitled 'Report on the staple length of the Indian Cotton Crop of 1950-51 season'
- (ii) Statistical Leaflet No. 2 (Seventeenth issue 1949-50) entitled 'Stocks of Indian Raw Cotton held in the Indian Union by the mills and the trade on 31st August, 1950.'
- (iii) Statistical Leaflet No. 4 (Eighteenth issue 1950-51) entitled 'Exports by sea of Indian raw cotton classified by varieties 1950-51 season'
- (iv) Statistical Leaflet No. 5 (Tenth issue 1948-49) entitled 'Report on the accuracy of the All-India Cotton Forecast of 1948-49 season'
- (v) Statistical Leaflet No. 5 (Eleventh issue 1949-50) entitled 'Report on the accuracy of the All-India Cotton Forecast of 1949-50 season'
- (vi) Statistical Bulletin No. 16 (1945-47) entitled 'Supply and distribution of the various types of Indian cotton during 1945-46 and 1946-47 seasons'.

Only such Research Stations are shown in the above map where schemes financed by the Indian Central Cotton Committee are in operation.

CHAPTER III

RESEARCH

Most of the research work financed by the Committee is concerned with the improvement of the yield of cotton plant and the quality of its produce, the primary objective being to enable the cotton grower to secure the maximum cash return per acre. Schemes are, therefore, in operation for the production of disease-resistant varieties suitable for cultivation in different cotton tracts. Research on cotton technology and the physiology of the cotton plant also receive due attention.

A majority of the research schemes are financed entirely by the Committee; the cost of the remaining few being shared by the Committee and the State Governments concerned. During the past nine years, the Government of India have made large grants from its Cotton Fund to meet the expenditure on the research and extension work.

TECHNOLOGICAL RESEARCH

As usual, the Committee's Technological Laboratory continued to render valuable service to the Cotton Breeders in their efforts to evolve new varieties of cotton by giving them the proper assessment of their spinning properties. The Cotton Trade and the Textile Industry also took full advantage of the facilities available at the Test House of the Laboratory.

During the year under review, the total number of samples received for various types of tests was 2,159 as against 1,848 last year, the number of reports issued being 526 as against 569 in the previous season. Facilities were provided for starting a second shift in the Test House and the Spinning Laboratory, so as to meet the heavy pressure of work, and to expedite the issue of reports on the increased number of samples that have been received.

Spinning tests were continued on the standard cottons grown on the experimental stations in the principal cotton growing tracts and on the trade varieties which are of fair average qualities and normally handled by the Trade and the Industry. During the year under review, H.420 was included for the first time in the list of standard lint cottons. The result of these tests were as usual published in the Technological Bulletins.

Spinning tests carried out during the year on the samples of improved cotton varieties obtained from their various stages of multiplication to ascertain whether the quality of the same strain in different stages of generation was kept up. The results showed that apprehensions about the variation in the quality from generation to generation were not justified.

Good progress was made during the year with the technological investigations which are under way at the Laboratory, a brief resume of which is as follows :—

(A) **Ginning.**—1. A lint cleaner for economically cleaning lint after ginning is being designed.

2. Pre-cleaning and ginning tests were carried out on Laxmi and Karunganni varieties and the results obtained confirmed mostly the previous findings.

3. Investigation on the spinning quality of samples of lint obtained by three treatments, viz., (i) Ginning kapas without cleaning, (ii) pre-cleaning of kapas and ginning, and (iii) ginning of kapas and cleaning lint in crighton opener showed that the cleaning of lint in crighton opener before baling tended to lower the spinning quality to some extent. The blow-room loss of crightoned samples (treatment iii) was, on the average, some 2 percent lower than that of pre-cleaned kapas samples (treatment ii) while it was 3.5 percent lower than that of the uncleaned samples (treatment i).

4. Preliminary tests carried out on double action single roller gin when converted to single action showed that from the point of view of outturn for long-staple cottons, single action was beneficial.

5. Two experiments were carried out to determine the extent of variation in spinning percentage when conditioned at different relative humidities. One was to condition the samples inside a constant humidity chamber for about six hours, and the other for over a week. The results obtained showed that the variation of ginning percentage with relative humidity was negligible in both the experiments.

6. Preliminary experiments carried out in order to ascertain as to how far ginning contributed to the production of neps showed that the hand ginned lint gave few neps, while the roller ginned and saw ginned lint showed neps per unit weight which were in ascending order of magnitude.

(B) **Investigation on fibre-properties.**—1. Experiments to determine the strength of attachment of fibre to seed conducted with the help of an apparatus specially designed for the purpose showed that the number of seed-coat fragments pulled out from the seed were in ascending order of magnitude for *herbaceum*, *hirsutum* and *arboresum* species. Seed coat from the chalazal region of the seed surface was more easily pulled out than that from other portions, owing to the comparative weakness of the cell structure in that region. The strength of attachment of fibres was higher at the micropylar end than at the other regions and that of fibres to the seed coat was much lower than the fibre strength. Furthermore, the power required for extracting fibres from the seed is considerably less than that consumed by the gin for ginning the same quantity.

2. Study of the relationship between the intrinsic single fibre-strength and Pressley strength index with spinning value conjointly with mean fibre-length, mean fibre-weight per inch, showed that any estimate of spinning value based on mean fibre-length, mean fibre-weight per inch and Pressley strength index was as accurate as that made by using intrinsic fibre strength in conjunction with the other two fibre-properties.

3. Further studies with different group strengths of fibres showed that while the Pressley flat bundle strength, single fibre-strength, intrinsic fibre-strength and percentage of mature fibres progressively increased as the group-length increased, the mean fibre-weight per unit length decreased with increasing group-length.

4. Since the perimeter of cotton fibre is known to be a fairly stable character, it is being measured on undeveloped fibres before secondary thickening starts in order to correlate it with dimensional characters in the ripe state. For this purpose, green bolls produced from dated flowers at three development stages, viz., (a) approximately a week before the half-maturation period, (b) just about the half-maturation period itself and (c) approximately a week after the half-maturation period for 19 varieties have been collected. Tests on them are in progress.

5. Preliminary to the measurement of surface area per unit mass (specific surface) of fibres of standard Indian cottons, the effects of treatments such as wax extraction, kier-boiling and bleaching and dyeing on the surface area of a known weight of fibres were studied. The results

obtained showed that the specific surface area of these treated samples was nearly the same as that of the untreated sample for N 14 and Madras Uganda 1.

(C) Investigation Relating to Fibre-Properties and Yarn Characteristics.—Regression formulae connecting the spinning values of irrigated cottons grown in the Punjab and Madras States with their chief fibre-properties are being worked out.

2. Influence of different length groups of fibres of Co. 2 varieties on its yarn strength is being studied. The method followed is to dye 6 samples, each with a different dye. From each of these dyed samples different length groups are sorted out. Later, they were spun with different combinations of group-lengths, etc., after making them into slivers. The yarn strength of these samples showed that the fibres in the region of modal length contributes most to yarn-strength. Further, experiments on the effect of increasing the percentage of the three higher group-lengths in the mixture on yarn strength were made. These three group-lengths were also spun pure. The results obtained in this investigation showed that fibres longer than 23 mm. were mostly found to break in strength tests for 20s yarns.

3. For the measurement of fibre bundle strength at different twists and gauge lengths with a view to correlating it with spinning value, a special device to hold the Pressley clamps was designed which could be fixed to the two jaws of the single thread strength tester, either of the Schopper type or the Scott I P 2 type. Preliminary experiments which were conducted to decide the particular strength tester which could be used for these tests, showed that Scott Tester and Schopper Tester worked with a rate of traverse of 4" per minute gave values quite close to each other. Further work is in progress.

(D) Investigations Relating to Spinning Characteristics and Yarn Properties.—1. In addition to a small ring frame of 8 spindles capable of spinning yarn direct from finisher draw frame, a 18" miniature card was also fabricated which makes up a spinning unit.

2. The investigation on the technique for spinning small samples weighing 60-150 gms was extended to 40s counts. 57 samples have been

spun into 40s yarns both on small samples employing the special technique and on samples weighing 10 lbs. employing the normal processing and the results obtained are being statistically analysed.

3. Tests on samples drawn from Broach Vijay bales stored in Broach and in Bombay after a lapse of 6 months had shown that storage for this period had not affected the lint quality.

(E) **Chemical Problems.**—1. Studies to determine the fibre-maturity by differential dyeing methods, showed that the use of two direct colours, chlorantine fast green BLL and diphenyl fast red 5 BL in a mixture, could give results which were in good agreement to those obtained by microscopic examination of fibres swollen in 18 per cent. caustic soda solution.

2. Experiments on the sugar contents of Indian cottons indicated that it varied from 0.03 per cent. to 0.25 per cent. depending on the variety of cotton. The sugar contents, on the whole, being quite low, were not found to affect the spinning quality.

3. In order to estimate the mechanical degradation of Indian cottons during processing, samples of Laxmi cotton, ginned in saw gin and in double roller gin were collected at each stage of processing during spinning. They were tested for chemical degradation by cuprammonium fluidity method. Data collected so far suggested that there is a certain amount of degradation during processing.

(F) **Work in States.**—In addition to the above investigations at the Laboratory, the Technological Assistants stationed at the various cotton breeding stations to assist the Cotton Breeder in the evolution of better quality strains have also carried out certain technological investigations during the season. A summary of the salient points under each station is given below :—

1. **Abohar.**—Preliminary studies with regard to heritable nature of neppiness showed that there is considerable variation in the number of neps per gram of cotton from family to family and even from plant to plant. Further, it was found that while neppiness is not correlated with (i) mean fibre-length, (ii) fibre-weight per unit length or (iii) the percentage of immature fibres; it shows some relation with the maturity coefficient.

Another investigation at the station showed that the optimum sowing period for 320F and 216F to get their best performance in so far as fibre properties were concerned was between the last week of April to the middle of May.

2. **Coimbatore.**—It was noted that when old seeds (20-24 months) of Co.4, N.14, K.5 and W.1 are sown along with the seeds for the current season, there is no appreciable difference between the fibre properties of samples obtained from these two types of seeds.

Studies of the fibre characters of five established varieties from six stations showed that the mean ginning percentage is the highest for Siruguppa samples and the mean fibre-length for Koilpatti, Palur, which has a different growing season shows the maximum fibre-weight.

K.1 and K.5 when grown under irrigated and rainfed conditions show an appreciable increase in the mean fibre-length under irrigation but there is no such change in the fibre-weight.

3. **Dharwar.**—Observations in a sowing date experiment (5 sowing dated \times replications) with Jayadhar showed a tendency for ginning percentage and the mean fibre-length to decrease with the advance in the date of sowing.

During the period under review, a device for the quick determination of the ginning percentage was developed.

4. **Indore.**—A preliminary investigation in connection with the effect of irrigation on maturation period (November) of American cottons at Malwa showed that there is a tendency for the irrigated cottons to become finer and less mature than the control.

A regression formula for predicting the spinning value of Malwa Americans from their fibre properties was also worked out.

5. **Nanded.**—A study of the fibre properties of G.6, Co.4 and Parbhani cotton grown under dry and irrigated conditions showed that Gaorani 6 is slightly longer when grown under irrigation; the other two cottons showing no such change either in the mean fibre-length or fibre-weight per inch.

6. **Surat.**—Studies showed that the interspecific hybrids grown under irrigation are generally longer than those grown under rainfed conditions. The cross (Co.2×S.1) F_1 grown under irrigation had a staple length 1.23"—1.41".

In a preliminary study of the variation of the fibre-length of Suyog and Vijay raised at various localities, it is noticed that the range of length for Suyog and Vijay lies between 0.90'-1.01" and 0.82"-0.94', respectively.

AGRICULTURAL RESEARCH

A. FUNDAMENTAL RESEARCH

The agricultural research work on cotton of fundamental nature is conducted largely at Institute of Plant Industry, Indore, and that on interspecific hybridisation is carried out chiefly at Surat in the State of Bombay.

The work done during the year under review is described in the following paragraph :—

1. GENETICS AND GENERAL BOTANY

(i) **Lintlessness.**—Studies in F_2 progenies grown during the year show that li_f , the Banilla lintless gene is linked with Y_a locus with about 17% crossover.

It was also noted that the lintless genes (a) li_f , (b) li_e , (c) li_d , (d) li_c , (e) li_b , and (f) li_a , are found to be assorted independently of the loci mentioned in the following gene groups respectively :—

(a) $L, Ne, R_2, P_b, Lc, Lc_2$, (b) Ne, Y_b, P_b, Lc_2 , (c) R_3 , (d) R, Y_b, P_b, R_2, Lc_2 , (e) Ne, Y_b, P_b and (f) Ne, Y_b, P_b .

The presence of lint quantity modifiers of the genes li_b , and li_d , in their F_2 , with various unrelated lintless types, could be easily followed because of the distinctive pleiotropic effects of li_b characterised by naked seed, and li_d by star-hairs on the young leaves, and are under study.

(ii) **Fuzz colour.**—The progenies isolated for green and white fuzz bred true to this character.

(iii) **Jassid resistance.**—As the season was unfavourable for the incidence of Jassids, no further progress was made in this work.

(iv) **Chlorophyll deficiency.**—Data collected during the season showed that Jarila light green assorted independently of Y_b , P_b , N_s , L^c , L_a , R_2 and L loci.

(v) **Anatomy of cotton leaf.**—Study of foliar anatomy of 21 cotton varieties showed that varieties belonging to the American species *G.hirsutum* had a lower frequency of stomata per unit area as compared with *desi* species *G.arboreum* and *G.herbaceum*. Old world species were further characterised by second palisade layer of tissues in their leaves which was generally absent from *G.hirsutum*.

(vi) **Interspecific hybridisation.**—A special scheme for the work of interspecific hybridisation has been in operation since 1938 at Surat (Bombay State). Its object is to obtain fully fertile hybrids between Asiatic and American cottons, combining the useful agronomic characters of both, particularly the good staple length of the American varieties with hardiness and adaptability of the Asiatic varieties.

During the year under review, strains 170-Co.2 and B.C.68×22, proved to be the most promising in a large scale varietal trial carried out under rainfed conditions on the Surat Farm, with the local Suyog as control. Although they yielded kapas as much as Suyog, they were much superior to it in respect of Staple length, fibre weight, feel and spinning value. They also proved superior to Co.4/B.40 in all economic characters in the partially irrigated trials conducted on the Kopargaon Farm in the Deccan Canal Area. As such strain 170-Co.2, is being multiplied to replace Co.4/B.40 in those areas.

The interspecific hybrid material produced at Surat was tested during the year for its utility in other States in India. Accordingly, the Cotton Specialist, Coimbatore, reported that types No. 1821 and No. 2196 were resistant to Jassid and Black-arm respectively. Similarly, the Cotton Breeder, Dharwar, reported that selections (i) 135-Co.2-B.16 (ii) B.C.134-C.W., (iii) 117-Co.2 and (iv) K.A.D.5 from the Surat material, were found to be more or less resistant to both black-arm & red leaf blight. These promising types were being utilised in breeding strains suited to local conditions in the respective tracts.

F_1 hybrid of *hirsutum-barbadense* (Co.2×S.1.) was again reported to be highly vigorous both in respect of growth and yield of seed cotton. It possessed extra long staple (1.38") and was possible to grow it in Goradu.

soils of Kaira district as a substitute for tobacco. However, pink bollworm which affects the boll opening and lowers the quality of the produce is stated to be the serious limitation to its cultivation.

Among crosses involving *hirsutum* and wild *Gossypium* species, viz., *tomentosum*, *armourianum* and *anomalum*, it was observed that those between *hirsutum* and *tomentosum* which have been given the new name "co-tom", are most promising and are stated to be drought and jassid resistant. These are being studied in detail.

2. PHYSIOLOGY

The physiological research detailed below under sections (i), (ii), (iii), (iv), and (v) was carried out at Indore under the Cotton Physiological Research Scheme, which commenced in 1944. It aims to obtain, as far as possible, a precise knowledge of the relationship between the soil, climatic and agronomic factors on the one hand and the plant growth and production of different varieties.

(i) **Effect of trace elements.**—During the year under report, the experiments conducted on the effect of trace elements showed that the same trace element did not significantly increase the yields in all the experiments. The behaviour of these, viz., Chromium, Zinc, Copper, Manganese and Boron was very variable in respect of their effect on increasing cotton yields. The quantity of a given trace element left over at the end of the season was stated to depend not only upon the dose given, but also on its solubility in water. In the case of less soluble salts like those of manganese copper and boron, the residual effects are likely to persist even if the doses were considerably reduced. Further application of larger doses were stated to have produced a depressing or toxic symptoms on the crop. Study of their economics showed that their application was uneconomic as it failed to cover the cost during the first four years.

(ii) **Studies on the effect of hormones.**—With regard to the effect of the hormones, it was observed that the use of three of them, viz., A-naphthalene acetic acid, B-Indolylbutyric acid and Tri-iodo-benzoic acid, on Indore I and Malvi 9 on a field scale increased their kapas yields from 15 to 20%. The nitrogen content of the leaves of the plant when treated with Tri-iodo-benzoic acid was found to be more than others and, therefore, explains the extra yield in that case.

(iii) **Effect of burning stubbles on cotton yield.**—The study of the effect of burning stubbles in the field in comparison with the application of ash on cotton yields showed that increased yields ranging from 22.2% to 31.7% were obtained in respect of the former treatment.

(iv) **Physical and chemical properties of soil.**—The soil analysis of the Mewar soils to study the suitability for growing American cottons showed that the Harda (district Bhilwara) soils are more alkaline, but they have very much lower concentration of the water soluble salts than either at Kapasin (District Chittor) or Bhilwara. The clay percentage is low and the sand is high as compared to the other two places.

(v) **Possibility of growing American cotton under rainfed conditions in Mewar tract.**—Experiments conducted to compare the performance of *desi* cotton side by side with American cottons in Mewar again confirmed that the yields of American cotton types were on a par with those of *desi* and that irrigation given at any stage would increase the yield three to four times in either variety. In view of this, it was considered that the *desi* varieties could be replaced by the American types in Mewar.

(vi) **Investigation into the possibilities of growing long staple American and Egyptian cottons in Bombay-Karnatak.**— This scheme was sanctioned in February, 1949, for a period of 5 years and put into operation on the 11th August, 1951. Its object is to study the cotton plant in all aspects under Karnatak conditions and then to apply that knowledge for either increasing the yields and acreage of cotton growing still finer types of the same. The field work of the scheme is being conducted at 2 centres, Dharwar and Gadag, and laboratory work at the Chemical Laboratory of the College of Agriculture, Dharwar.

During the year under review, experiments for studying the effect of time of sowing and different levels of nitrogen on the growth and yield of Jayadhār and Laxmi cottons at Dharwar and Gadag were initiated. Preliminary studies on the growth of American and Egyptian types under rainfed conditions were also undertaken.

(vii) **Study of crop weather relations.**—A special scheme was started in 1947 under the auspices of the Director of Meteorology, Poona, for the study of the effects of climatic factors on plant growth, crop yield and the

incidence of pests and diseases. During the year under report, full meteorological and crop growth data were collected at Coimbatore, Koilpatti and Hagari (Madras State), Parbhani (Hyderabad State), Dharwar, Jalgaon, Surat and Viramgam (Bombay State), Nagpur and Akola (Madhya Pradesh), Hansi (East Punjab), Babbur (Mysore State) and Indore (Madhya Bharat). It showed that the dates of cotton sowing in the country varied from the last week of June in Madhya Pradesh, Gujarat and Hyderabad to the first week of November in the extreme south of the peninsula on account of the variability of the monsoon. Furthermore, the vegetative growth of the crop was dependent upon the rains received during this period. Surat had very good rains during July and August but Viramgam had them only later on and which could not be utilised by the crop with the result that while the crop at Surat attained a height of 100 cms., the one at Viramgam was on an average only 65 cms. tall. The kapas yields at both these centres were affected by the drought that set in the middle of August. The duration of flowering varied from more than 100 days at Nagpur and Surat to less than 50 at Jalgaon and Viramgam and its intensity and duration influenced and affected the final yields, from place to place. From the comparative figures of the two previous years, it was seen that the crop in the season under report gave an usually bumper yields, particularly at Akola. This has been attributed to adequate rainfall during both vegetative and reproductive phases and absence of abnormally dry spells and pests.

(viii) **Investigation of stability of nitrogenous fertilisers in Indian soils with special reference to their availability for cotton.**—This work is being carried out under a scheme operating at the Institute of Science, Bangalore, with a view to determine the extent of the loss of nitrogen by volatilisation of ammonia resulting from the decomposition of nitrogenous fertilisers in cotton soils and to devise methods to minimise the same if not altogether prevent it so that the cotton yields would be enhanced.

During the first two years of its operation, the experiments were entirely confined to the laboratory but during the season under report, the studies were extended to field trials at Hiriyur and Mandya in Mysore State. Previous laboratory studies had shown that when ammonium sulphate was added to cotton soils which were most alkaline heavy loss of nitrogen occurred due to volatilisation of ammonia. It was further noted that this

could be reduced by increasing the C/N ratio in the soil. It was, however, felt that the source, quantity and time of application of organic matter were important factors since it was likely that the application of organic matter itself might adversely affect nitrate formation and reduce the yield. Experiments have been, therefore, carried out under field conditions to determine the same, during the year. These showed that dry leaves, low grade farm-yard manure and cotton plant stubbles were useful in minimising the loss of nitrogen from added ammonium sulphate. It was also noted that while low grade farm-yard manure was found to be beneficial immediately on application, cotton plant stubbles took nearly two weeks to become useful to the soil. This difference is stated to be due to the fact that cotton stalks take much longer time to decompose in soils.

3. AGRONOMY

Agronomic work conducted during the year 1951-52 at the Institute of Plant Industry, Indore, was as follows :—

(i) **Soaking of seed in nutrient solutions.**—The effect of sowing cotton seeds of two varieties, viz., Bhoj and Indore 1, soaked in molar solutions of Ammonium sulphate, ammonium phosphate, mono-potassium phosphate was again studied and the results showed that the soaking of seeds in various salt solutions did not bring about any significant differences in the yields of cotton.

(ii) **Effect of different leguminous crops on the yield of cotton grown after them.**—This investigation also was continued during the year and involved growing of Bhoj cotton after soyabean, groundnut, cowpea, gram, tur, sann and jowar, the last being treated as control. All the crops preceding cotton had been manured with superphosphate at the rate of 30 lbs. P_2O_5 per acre. The cotton plots were divided into two halves and one half of each plot was manured with groundnut cake at the rate of 30 lbs. nitrogen per acre. The average yields obtained from different treatments were as follows —

	Soyabean	Ground- nut	Cowpea	Gram	Tur	Sann	Jowar	Sig. Diff.
Yield of kapas lbs. ... per acre	633	659	661	574	578	580	438	108

Cotton following a crop of jowar again gave the lowest yield. All the leguminous crops increased the yield of cotton and the increase was significant. The differences in the yield of cotton due to different leguminous crops were not significant. It, however, appears that the yields of cotton following shallow rooted legumes like *soyabean*, *groundnut* and *cowpea* were higher than those obtainable after deep-rooted ones. Phosphatic manuring of legumes increased the yield by 144 lbs. per acre of the succeeding cotton, although this increase was not significant.

Nitrogen applied in the form of groundnut cake directly to cotton gave a significant increase of 142 lbs. per acre over control.

(iii) **Long-term rotational-cum-manurial trial.**—This trial is being continued since 1947-48 season. During the season under report, samples of wheat and jowar grain were analysed chemically to find out the nitrogen and phosphoric acid contents in the grain. The average values of chemical analysis for four seasons showed that phosphoric acid contents were increased in the grain of jowar as well as wheat in the manured plots, the increase being observed more for the former crop than the latter one.

4. STATISTICS

The work on statistics is being done at the Institute of Plant Industry, Indore, the details of which are as follows :—

(i) **Field technique.**—Investigations were continued during the year on the relationship between the degree of accuracy shown by the double lattice design and actual factors, such as size and shape of plots, shapes of incomplete and complete blocks, the degree of soil heterogeneity of the land on which the experiment is located, that enter in a layout, with the data of six uniformity trials conducted on four crops, viz., cotton, jowar, paddy and jute. To study the combined effect of the several factors, multiple correlation coefficients between the degree of efficiency on the one hand and two or more factors, taken together, on the other, were calculated and are given below :—

Factors.	Multiple correlation coefficients	Percentage variation accounted
X ₁	0.3604	13.0
X ₁ , X ₂	0.4022	16.2
X ₁ , X ₂ , X ₃	0.4480	20.1
X ₁ , X ₂ , X ₃ , X ₄	0.4790	22.9
X ₁ , X ₂ , X ₃ , X ₄ , X ₅	0.4797	23.0

where X_1 , X_2 , X_3 , X_4 , X_5 stand for (1) Plot size (sq. ft.), (2) Plot shape (L/B^*), (3) Incomplete block shape (L/B^*), (4) Replicate shape (L/B^*), and (5) Standardisation, respectively.

The multiple correlation coefficient between the degree of accuracy of double lattice design and all the five factors taken together attained a value of 0.48 and could thus account for only 23 percent variation in the values of efficiency. The multiple correlation coefficient, although small in magnitude, was highly significant. This significant value was mainly due to the influence of plot size, which had a wide range of 6 to 1045 sq. ft. amongst the factors selected above, the other four being more or less having optimum conditions of layout were ranging between narrow limited.

The results, obtained above, were based on the linear relationship between the individual factors and the degree of efficiency while the actual relationship may be non-linear or even logarithmic or other complicated functions of the factors may be involved.

(ii) **Genetic variability and response to selection.**—The selection experiment, consisting of progenies of six *arboreum* crosses for high and low staple length, which is in progress from F_3 generation onwards was continued, to F_{11} stage in 1951-52. Examination of the mean halo-length for high and low lines in each cross showed a declining trend in F_{10} and F_{11} generations as compared to the progressive one which was observed upto F_9 generation. This unexpected result was due to the unfavourable monsoon conditions in both the seasons, 1950-51 and 1951-52, there being no precipitation after the month of August.

Statistical analysis of the characters again confirmed the results obtained so far, that the progenies selected for longer halo-length had a significantly lower ginning percentage in all the six crosses and a significantly higher yield than the latter in most of the crosses.

(iii) **Area sampling.**—Since, knowledge of total production of the cotton is dependent on the estimate of area under the crop, it was thought necessary to verify the accuracy of the acreage data employed in the crop cutting surveys. In view of this need, investigations were started to develop a suitable area sampling technique for estimation of the acreage under

$L/B^* =$ Ratio of length along and across the rows of crops irrespective of whatever dimension was longer.

the crop. Accordingly, data for complete enumeration of the agricultural area for Akola district in Madhya Pradesh for the year 1945-46 were examined and a number of aspects of sampling with special reference to estimation of cotton acreages were investigated. Villages were stratified according to their size and a sample of 108 villages was allocated in different strata. Three methods of estimation, viz., (1) Simple mean, (2) Regression and (3) Ratio, were employed. The standard errors in percent for the estimates obtained in percent for the estimates obtained from the above three methods are given below :—

Method of estimation.	S.E. per cent.
Simple mean	3.6
Regression	2.8
Ratio	2.6

The last two methods, viz., regression and ratio were more precise than simple mean as judged from the magnitude of standard error per cent.

When the ratio of the cotton acreage for the year under study to that of the preceding year for 108 villages consisting the sample was taken, it was observed that cotton acreage for the whole district of Akola could be shown by percentage error of .0.7 of the estimate. This resulted in making size stratification 460 per cent efficient as compared to complete random sampling.

B. APPLIED RESEARCH

Applied research work of the Committee essentially consists of the evolution of improved varieties for the different tracts and also the study of the methods of their cultivation and as such it has necessarily to be conducted in the respective tracts.

The work done during the year in different States in these directions is described briefly in the following paragraphs :—

BOMBAY

1. **Scheme for cotton breeding in Khandesh.**—This scheme was started in April, 1948, its objective being (a) to test extensively the strain 197-3, now called Virnar, in the district and (b) to improve the staple of 197-3 by crossing it with fine long staple *arboreum* varieties.

During the year under report, trials of Virnar against Jarila, H.420, Pratap and local non-descript varieties on the Jalgaon Farm and six centres in the district on cultivators' fields showed that Virnar was most suited to the Khandesh tract in view of the acre cash return it gave to the grower.

Study of the secondary selections of Jarila and Virnar showed that many of the sub-selections in the latter were C.E.G. selections 294-4, 29-7-5 and 29-7-6 were promising.

Work was also continued on crosses of (i) Virnar \times Coimbatore long staple arboreums and (ii) (Virnar \times Coimbatore long staple arboreums) \times Dhulia-2 selections.

2. Scheme for breeding wilt-resistant cottons in Surat area.—This scheme was sanctioned by the Committee in 1936 and put into operation in April, 1937, with the object of obtaining a strain of cotton completely resistant to wilt and suited to the soil and climatic conditions obtained in the tract.

Selections are being tested for wilt resistance under optimum conditions of infection at Poona under field conditions at Shera.

During the year under report, the incidence of wilt was not pronounced at Shera due to abnormally dry conditions. However, the tests conducted under controlled optimum conditions at Poona, showed that strain 3652 has attained a 98% resistance to wilt. The resistance of strains 2087 and 2266 was also noted to be about 90%. In the circumstances, it is expected that they would prove completely resistant to wilt under field conditions. The strain 2087 evolved under the scheme is being multiplied for replacing Suyog and 1027 A.L.F. in the Surat zone.

3. Broach cotton breeding scheme.—This scheme has been in operation since April, 1932. Its present objective is to obtain by selection or hybridisation a suitable type of cotton which could yield, gin, spin and resist wilt (*fusarium*) better than Vijay.

Results of the large scale trials conducted during the year under report of three strains, viz., 66-60, 94-24 and 98-24 on Broach and Dabhói farms and at 3 centres in the district showed that the strain 66-60 being an improvement over Vijay in respect of staple length and feel gave 6% better

yield than Vijay. Strain 98-41 was found to be earlier maturing and found to possess remarkably fine quality, being capable of spinning as high as 50 HSWC.

Small scale bulk trials of certain promising cultures of the above three strains conducted at Broach and Dabhoi farms showed no appreciable superiority over Vijay. Nevertheless, the cultures, viz., 66-60-3-2-12-2 and 98-41-10-19-5-3 appeared promising and deserved further trial.

4. Scheme for improvement of Wagad cotton at Viramgam, Jagudan and Bavla.—This scheme was sanctioned in August, 1935, to carry out intensive work for the improvement of Wagad cottons, by introduction of an early maturing habit and staple fineness in them. This was sought to be achieved by obtaining the Iranian *herbaceum* for hybridisation work for which an Officer was specially deputed to Iran. The work of this scheme has during the past 15 years produced an improved strain 'Kalyan', which is superior to local wagad practically in all respects. The present object of the scheme is (a) to test the suitability of Kalyan over the whole Wagad tract and (b) to evolve a strain which while maintaining lint characters of Kalyan would be superior to it in yield of kapas per acre and early maturity.

During the year under report, three new strains, viz., 82, 279 and 280 were tested for their performance against Kalyan and local Wagad on the cultivators' fields at three centres, viz., Viramgam, Bavla and Jagudan in the tract. The result showed that while these strains were superior to local Wagad in all respects, none of them was better than Kalyan. The study of large number of cultures in small scale trials and also in compact family blocks, also showed that none of them was promising. Further improvement work on Kalyan by hybridisation is under way.

5. Scheme for improvement of Mathio cotton.—This scheme was started in June, 1937, with the object of evolution of a strain of cotton which would be an improvement on Mathio mixture in respect of yield, ginning percentage and quality of staple. As a result of the work carried out during the first 15 years of the scheme a superior spinning and high yielding strain 'Pratap' was evolved to replace the Mathio mixture. The present extension of the scheme has been sanctioned for further improvement of Pratap in respect of all economic characters.

During the year under report, a large scale varietal trial of 8 new strains at Amreli showed that CJ.73 was an all round improvement over Pratap and, therefore, deserved further trials in the districts.

Further study of a large number of progenies obtained from the crosses of Pratap X Coimbatore arboreums and Pratap X C-520 showed that five progenies derived from the former cross were promising.

6. Scheme for improvement of Dharwar-American cotton.—This scheme was sanctioned by the Committee in July, 1941, with a view to improve the Dharwar-American cotton crop grown in the Kannada districts of the Bombay State and the adjoining areas of the States of Madras, Hyderabad and Mysore. This was sought to be achieved by the production of an early maturing type of cotton superior to Gadag 1 in respect of yield, staple length, ginning percentage and resistance to red leaf blight. As a result of the work carried out in the past an improved variety of cotton 'Laxmi' has been evolved which is superior to Gadag-1 in almost all respects. This was further confirmed by the results obtained during the year under report. The trial of superior spinning Coimbatore strains and Surat American strains evolved from the interspecific hybrid material showed that none of them could come up to the standard of Laxmi.

7. Scheme for the introduction of perennial cottons in selected localities in the Indian Union.—This scheme was approved by the Committee and came into operation at Dharwar in June, 1950. It aims to study the role of perennial cottons in increasing cotton production of the country without encroaching on the area under food crops.

The results of trials conducted during the year under varying conditions of soil and climate in the Bombay-Karnatak have revealed that Moco cotton alone combined good lint yield with satisfactory halo length and other economic characters. Samples from different tree cottons were tested, and only 10 were found to be worth further study.

Of the four soil types on which tree cottons were cultivated, it was found that they made good growth on fertile red and medium black soils. Good stand was obtained in 'mardi' and 'Hakkal' lands on hill slopes when seeds were dibbled in well manured pits. In deep black soil the crop made slow growth, and suffered comparatively more from *Alternaria* and black-arm diseases.

In the spacing experiments, it was noted that the 10' × 5' was the ideal spacing since it permitted the working of the bullock drawn implements in the second and subsequent years. Although the results in the past showed that unpruned crop yielded better than the pruned one, pruning on the 15th of June has been found to be necessary to enable inter-cultivation with bullocks possible, and to avoid the incidence and spread of scale insects, and also to keep the best bolls within easy reach for picking.

It is stated that hybrids between tree cottons and *hirsutum* annuals yielded better than those between tree cottons and Sea Islands (V.135). The best yielding hybrids under all types of soil were those between tree cottons and Co.4.

PUNJAB

(1) **Scheme for improvment of cotton of southern-eastern districts of Punjab.**—This scheme is an off-shoot of the Punjab Botanical Scheme and was started at Hansi in March, 1945, with the objects of (a) replacing *desi* cotton by high quality American cottons in the irrigated portions of the tract and (b) for reproducing improved variety of *desi* cotton to be grown in such parts of the tract as are not suitable for the cultivation of American varieties.

During the year under report, the work on *desi* cotton consisted of study of large number of F₃ progenies of the crosses between M60A.2 and 231 Rosea on one hand with the superior *arboreum* strains like H. 420 and 197-3 on the other. About 12 of these were found to be promising. Further a large number of single plant selections were also made during the year.

As regards the American cotton, it is noted that out of a number of re-selections made in 216F, 216F/4 was promising in view of its high ginning percentage and staple length. Hybrid progenies developed from crosses of strains AC 45, AC 47, AC 48 × (derivatives from the cross 45 × L.S.S.) on one side and AC 50, AC 51 and AC 53 (originated from the crosses of Punjab American types and wild strains from U.S.A.) on the other are promising, since they are on par with 216F in respect of kapas yield per acre and early maturity and superior to it in matter of spinning and ginning performances. Further, a large number of single plant selections having extra lint length were selected from the crosses between Punjab American and

Egyptians made in 1948-49 and their backcrosses to Punjab American made during the subsequent year.

2. Scheme for breeding long staple cotton in Punjab.—The work of the scheme was commenced at Abohar in April, 1948, with the object of breeding American varieties of cotton having a staple length of 1" and above, suitable for cultivation in the Punjab.

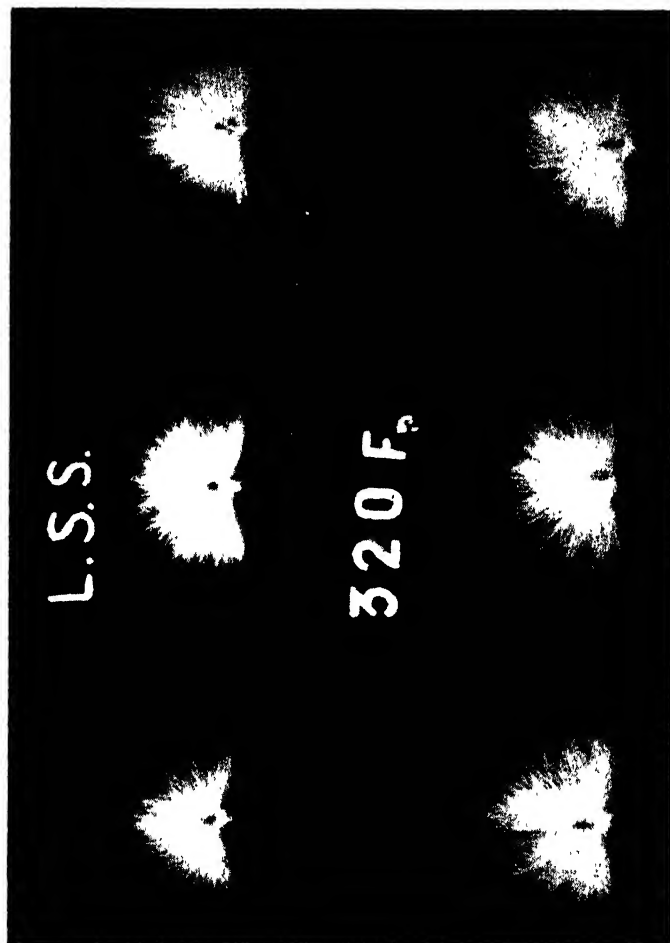
During the year under report, 65 progenies from crosses between Punjab American cottons and long staple *hirsutum* varieties and reselections from Madras *hirsutums* showed, a staple length exceeding 1" and 33% ginning percentage. Similarly a large number of high yielding single plants have been selected from the hybrid material produced by crossing Punjab American with Egyptian varieties, viz., Ashmouni and Giza. In the yield trial with a large number of long staple strains, the performance of LL.28 having a staple length of 1.02" and ginning percentage of 35.5 was promising.

3. Scheme for breeding American cotton suitable for introduction in sub-montane district of Punjab.—This scheme was put into operation at Jallundar in October, 1948, with the object of evolving American types of cotton capable of replacing the short stapled *desi* variety at present grown in submontane tract of East Punjab.

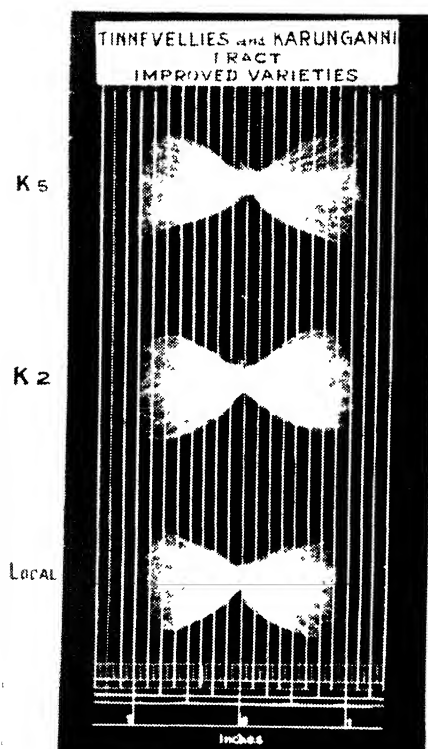
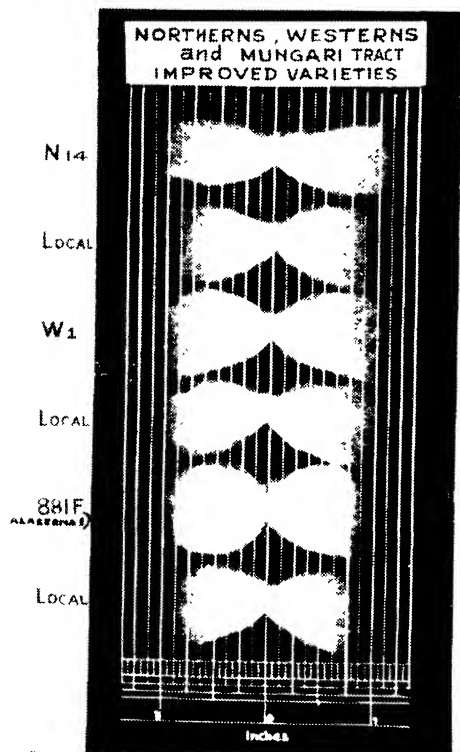
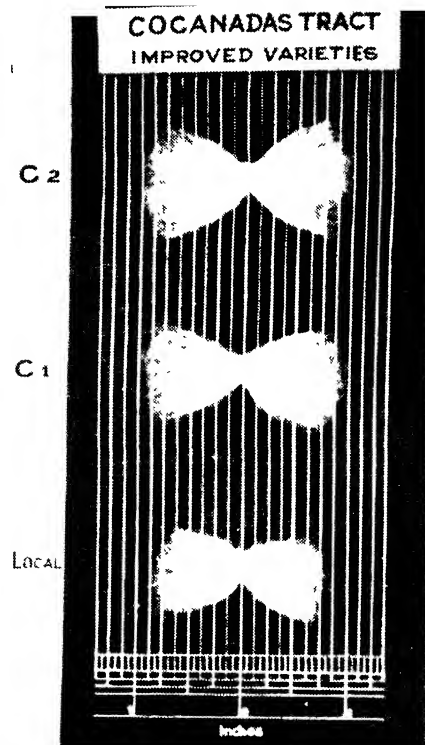
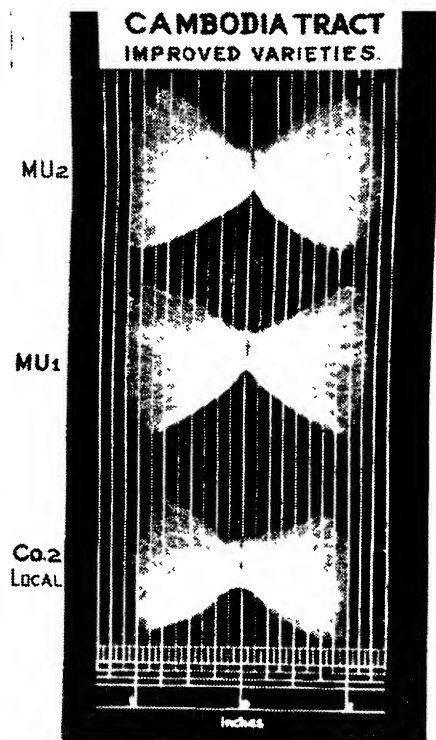
During the year under report, trials again showed that the American varieties of cotton could give higher yield than the *desi* varieties. Trials in the district showed that among the performance of 320F was the best and as such the Department of Agriculture is proposing to distribute its seed for general cultivation in districts of Jullundur, Ludhiana, Amritsar and Parts of Gurdaspur. Small scale trials showed that another strain 39F was very promising since it had a very high ginning percentage and good spinning quality.

Agronomic experiments regarding the growing of wheat crop after 320F conducted at the Government Farms and cultivators' fields confirmed the last year's findings that on fertile soil a remunerative crop of irrigated wheat could be grown as a second crop after cotton in the same year, but on lands of low fertility, application of 25 lbs. Nitrogen per acre from ammonium sulphate was necessary to get remunerative yield of wheat.

Sowing date trials conducted showed that the best time for sowing of American cotton in sub-montane tract was from April to first week of May.



Combed seeds of L.S.S. and 320F Punjab



MADRAS

1. **Scheme for improvement of Mungari cotton.**—This scheme was started in 1937 to evolve a strain of cotton which would possess the good staple qualities of Westerns and be suitable for cultivation in place of the short staple Mungari cotton in the *Kharif* season on the red soils of Bellary, Anantapur and Kurnool districts. As a result of last 15 years' work Rayalseema-1 was evolved and is being multiplied for general cultivation. During the year 1951-52, the work under the scheme consisted of yield trials of a number of new *arboreum* types that have been evolved in different States of India. In addition, about 140 cultures from the crosses of Koilpatti selections with other *arboreum* types were also studied. It was noted that selection 3930A and families 4572C, 4507C, 4502A, 4429D, and 4431B were promising.

2. **Scheme for improvement of Westerns Cotton in Madras State.**—This scheme was started in June, 1949, at Hagari. Its objective is to evolve an early maturing wilt resistant Westerns cotton having a staple length of 13/16" or over and a ginning outturn of at least 33 per cent. It should also be less wasty in the process of spinning.

During the year under report, 12 selections, 35 families and bulks, 354 progenies and a number of a F_1 and F_2 hybrids were studied. Although none of the selections yielded better than Westerns-1, 3870 IV/1-1-3 appeared promising from the point of view of fibre properties. In progeny rows, five of them, *viz.*, 4394, 4415, 4417, 4418 and 4428 were found to be equal in yield of seed cotton and superior in length and ginning percentage.

3. **Scheme for improvement of White Northern Cotton.**—This scheme was started in June, 1949, with the object of evolving a strain of cotton which would possess the staple length and fineness of N.14, ginning percentage of at least 33 and would be suitable for cultivation in the Northern tract.

During the year under report, four hybrid strains which had shown considerable promise last year did not keep up their performance in comparison with Nandyal 14. Trial of other material indicated that 9 progenies were promising.

4. **Scheme for improvement of Cocanadas Cotton in Madras State.**—The work of this scheme was commenced in 1938, with the object of im-

proving the yield and ginning percentage of Cocanadas cotton without losing the light pinkish colour of its lint.

During the year under report, strains 336-B, R.H.25 and Cocanadas 1 again showed their superior performance. Study of 27 family crosses of 336B with Manipur khaki and other coloured varieties showed that two types, viz., 336 D.3-2-1-3 and 336 D.2-3-46 were promising.

Work was also conducted to find out a superior strain to replace Chinnapathi cotton grown in the tract. In a trial of early maturing white **arboreum** strains grown in different parts of India, strain B.32-48-D.E. gave significantly better yield, than the local control, viz., Anakapalle white.

5. Scheme for breeding Cambodia cotton in ceded districts.—This scheme was started in April, 1945, with a view (a) to produce a long staple American variety capable of giving good yield when grown as irrigated **rabi** crop and (b) to find a good quality exotic type suitable for cultivation in lands not served by the Tungabhadra irrigation project. The work of the scheme is conducted at three centres, viz., Siruguppa—irrigated black soil, Hagari—unirrigated black soil subject to precarious and low rainfall and Nandyal—unirrigated black soil, receiving a relatively heavy rainfall.

During the year under report, G1 \times Co2-9-3 maintained its superior performance, under irrigated conditions at Siruguppa. In addition, inter-specific hybrid types 125 \times Co2 and 170 \times Co2, Parbhani types 2701, 2705 and 2730 were found to be promising. Further, Laxmi gave promising results in district trials, in spite of the season being adverse.

6. Scheme for improvement of Tinneveli and Karunganni cottons.—This scheme was sanctioned by the Committee in March, 1948, and was put into operation in June, 1949. Its object is to produce by hybridisation a strain of cotton possessing staple length over 15/16" and capable of spinning 40 warp counts suitable for cultivation over the entire unirrigated Karunganni area in the Central and Southern districts of Madras State.

It is reported that the seasonal conditions were unfavourable for crop growth for the fourth year in succession and in consequence, the kapas yields at Koilpatti and Coimbatore were stated to have been much

reduced. During the year, 9 cultures, though poor in yield, were found to possess better lint length and ginning outturn than the control at Coimbatore. At Koilpatti, one culture 6188-8 recorded higher yield and better lint length than the control K.2. It was, however, on a par with the control in respect of ginning percentage.

Further during the year under report, as a result of a critical examination for vigour, earliness, productivity and staple length of 340 crosses, about 90 promising single plants from the first generation and 309 desirable hybrids from the second generation have been selected for further examination.

7. Scheme for breeding long staple American cotton as a winter crop in Central districts of Madras State.—This scheme was started in April, 1949, with a view (a) to produce superior *hirsutum* types having a staple of 1.1/16" to 1.1/8" suited to Central districts and (b) to acclimatise and isolate a Sea-Island type suitable for growing in the heavy rainfall West Coast districts.

During the year under report, as set of 18 cultures was tested against Co2, 7682 and Madras Uganda 1 in the winter Cambodia tract. Of these, 3 cultures viz., 9,995, 0,734 and 9,030 were found to be promising. Selection 9,030, not only gave a higher yield of kapas than Madras Uganda 1 but also possessed longer lint and higher ginning outturn. The results of the preliminary district trials conducted during the year showed that 0734 and 9030 were found to be highly promising.

Trial of twelve selections and large number of progenies showed that quite a number of types having longer staple length and higher ginning percentage and better yielding quality than Madras Uganda 1 are available.

Further, 650 single plants were selected during the year from intra *hirsutum* and interspecific hybrid material.

With regard to the acclimatisation of Sea Island and *barbadense* varieties in the West Coast districts, it was reported that the range of variation in yield was rather wide and the pure crop fared better than the inter sown crop. Further, the variety Monteserrat yielded 246 lbs. of kapas per acre as a pure crop and 185 lbs. as an intersown crop in the

coconut garden at Pattambi as against 189 lbs. and 59 lbs., respectively, obtained in the preceding year under these conditions. Between the two varieties—St. Vincent and Monteserrat, the latter appeared to be more adaptable and worthy of further trials on account of its better yield, higher ginning percentage and higher boll size. It is, therefore, proposed to concentrate on this type alone.

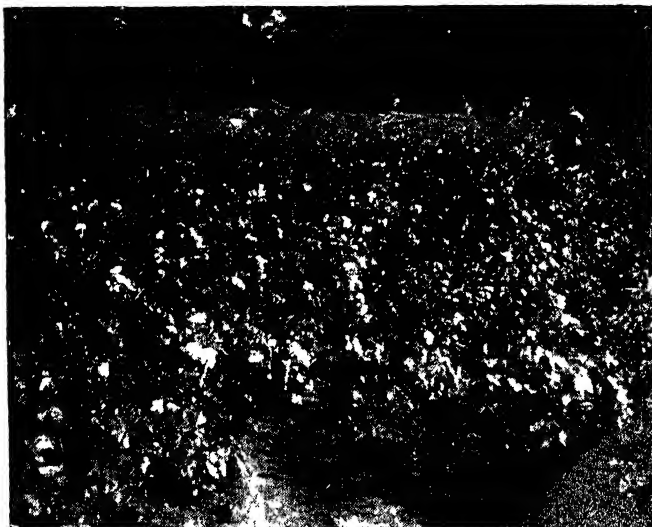
It was noted last year that sowing of the Sea Island corp in nurseries in the month of May and transplanting the seedlings in June yielded kapas 100 per cent. more than the one obtained by sowing it directly in the field in June. These findings were again confirmed by the results obtained this season.

8. **Scheme for production of long staple cotton in Madras State.**—This scheme was commenced in November, 1946, for (a) the isolation of upland strains having a staple longer than 1.1/16" and capable of maturing in 5.1/2 months and (b) the evolution of *barbadense* varieties equivalent to the average Egyptian standards suitable for cultivation in the coastal belts of South Arcot district. The rainfall was again deficient both at Palur and Sriviliputhur and consequently the final yields were below normal for the third year in succession. During the year under report, the new strain 7682 (Madras Uganda 2), is reported to have given positively higher kapas yield than Madras Uganda 1 in trials conducted on the cultivators' fields in the districts of Ramanathapuram, Madurai, Tinnevely and South Arcot.

Trial of seven hybrid selections at Palur and Sriviliputhur against Madras Uganda 1 and Madras Uganda 2 showed that strains 0511-F4, 9030 and 0484-A1 are finer and better in staple length than the strain Madras Uganda 1 and possess about the same ginning outturn. Five more selections were found to be promising at Sriviliputhur. 432 selections from the interspecific intra-*barbadense* and intra-*hirsutum* were tested at both these centres and only 20 were found superior in ginning percentage.

It is reported that the experiments conducted at Palur for ascertaining the best time of planting showed for the third year in succession that a good cotton crop could be raised in South Arcot district in the cold weather by planting it in August/September. Selection 0734 is stated to have been found to be the best amongst 5 strains for planting in the cold weather at Palur.

COTTON CULTIVATION IN CAUVERY DELTA--MADRAS



P 216F Cotton Crop at Vanthirajapuram



P 216F Cotton crop at Alangadu



Improved Buri strain from Madhya Pradesh

9. Scheme for breeding unirrigated cambodia cotton in Madras State.—This scheme was sanctioned by the Committee at its meeting held in February, 1949, and was put into operation at Periakulam on the 16th September, 1950. Its object is to evolve a sturdy type of Cambodia strain suited to the rainfed tracts in the central and southern districts of Madras, capable of yielding on an average, a bale of lint for every three acres and possessing a staple length of 15/16".

During the year under report, 13 cultures and 412 selections were tested against Co.2, 7682 and Madras Uganda in compact family blocks and replicated progeny rows, respectively. The results indicated that one culture and 29 progenies gave significantly better yield than Madras Uganda 1.

MADHYA PRADESH

(a) Scheme for improvement of cotton in Nagpur-Wardha districts of Madhya Pradesh.—This scheme was sanctioned by the Committee in November, 1947, and was put into operation on the 1st April, 1948. Its objects are (a) to evolve by selection and hybridisation somewhat late ripening strains of *desi* cotton, with ginning percentage of 33 to 34 and capable of spinning 20-25's standard warp counts, and (b) to isolate by selection improved strains of American cotton with ginning percentage of about 32 and spinning capacity of 35's to 40's standard warp counts.

During the year under review, six field scale trials and ten district varietal trials were conducted to study the performance of the two new strains 91 and 091 against H.420 and local jadt. Two more varieties, M.5A and 111 had been included in the district varietal test. The results did not establish the superiority of any of these types over control.

In the trials with the American cotton strains, Buri 0394 was found to be most promising in respect of yield over the local Buri, both in district trials as well as large scale field trials.

2. Scheme for improvement of cotton in Akola-Amraoti Districts.—This scheme is an offshoot of Berar cotton breeding scheme, and was sanctioned in November, 1947, and put into operation on the 1st April, 1948. The objects of the scheme are (a) to evolve somewhat late ripening strains of *desi* cotton, having strong stem with a staple length of 3/4 to

13/16 inch and ginning percentage of 34 to 35 and (b) to isolate improved strains of American cotton with a staple length of about 7/8" and ginning percentage of 33.

During the year, two varietal trials, one with *desi* and other with American varieties, were carried out at Akola. In the *desi* varietal trial, strains Nos. 091 and 91 were found to be most promising. In the American varietal trial 0394 was outstanding.

In the district varietal trial, tests with *desi* cotton were carried out at 9 centres and those with American strains at 6 centres on the Government Farms and cultivators' fields. Their results showed that among *desi* strains 91 and H.420 were promising, the latter giving the best cash return per acre to the grower. In the trials with American strains, 0394 was found to have combined the most desirable characters. Another new strain 176 was found to be equally promising.

In addition to the above trials, progenies' test, strains' test and preliminary varietal trial with *desi* and American cotton were also in progress at Akola during the season, and a good deal of promising material is on hand.

3. Scheme for improvement of cotton in Buldana tract.—This scheme has been functioning since the 1st April, 1948, and aims to isolate a strain of cotton which would be sturdier than Jarilla, and would suffer less damage. It should also possess good boll opening habit.

During the year, trials both on farm and in districts with four new strains, viz., M.5A, 91, 197-3 and 907 against Jarilla showed that M.5A was outstanding, and gave an acre cash value higher than either Jarilla, 197-3 or local jadi. Besides, M.5A has a sturdier stem with better boll opening habit and suffers less during adverse climatic conditions in comparison with Jarilla, 197-3 and 907.

The other trials conducted during the year at the station consisted of single plant progenies' test (210 non-replicated and 31st replicated), strains' test of 38 strains and preliminary varietal trial (ten new promising strains). Of these, 53 progenies were found promising.

4. Scheme for improvement of cotton in Ghat tract.—This scheme commenced its work at Yeotmal in April, 1948, its objects being the

evolution of high yielding strain having a staple length^{not} of 13/16" to 14/16", ginning percentage of 33 to 34, and the spinning capacity as good as that of V.434.

During the year under report, trials at farms and in cultivators' fields have shown that the strain 91 is the most suitable one for the tract in view of its yield, ginning and staple qualities.

A large number of secondary selections made in H.420 and other material were tested at the Station, and many of them are considered promising.

ASSAM

1. **Scheme for improvement of hill cotton in Assam.**—This scheme was approved by the Committee at its meeting held in January, 1944, and it came into operation in February, 1947. The object of the scheme is to produce high yielding types of Coarse short staple cotton with high ginning percentage.

During the year under report, 118 selections from local material were tested in progeny rows. Of these, 81 were found to be worth growing. In varietal trial, G-54-1 and D-46-2 gave an yield of 4.61 and 4.22 maunds, respectively, against 2.86 maunds recorded by the control. These will be further tested in the cultivators' fields during the succeeding year to confirm their performance.

2. **Scheme for Intensive Survey of cotton areas and collection of cotton materials in Assam.**—This scheme was started in January, 1952, with a view to make a botanical survey of the cotton growing areas in Assam and to collect cotton material for study and selection at Tura.

During the year under review, the two districts, (1) Garo Hill District and (2) Naga Hill District, were surveyed, the former having 26,000 acres under the crop, constitutes 80 per cent of the total cotton acreage in the State. The cotton that is produced in the Garo Hill district consists of short and coarse staple varieties of *G. arboreum* var. *cernuum* and *G. arboreum* var. *neglectum*, cultivated by the Hill tribes by the primitive "Jhuming" system.

In Naga Hills district, the area under cotton is about 800 acres only. It consists of short staple and coarse varieties of *G. arboreum* var. *cernuum*

and is sold entirely to its neighbouring State of Manipur where it is utilised for handloom purposes.

In all 128 samples (99 from Garo Hills and 29 from Naga Hills) were collected during the year and sent to Tura for further study.

HYDERABAD

1. **Scheme for improvement of cotton in Parbhani district.**—This is an offshoot of the Scheme for improvement of cotton of Oomras tract in Hyderabad. It was sanctioned in February, 1947, for a period of five years, with the object of (a) producing a wilt-resistant, heavy yielding and high ginning strain of cotton superior to Gaorani 12 for growing in Parbhani district, and (b) maintaining improved strains of American cotton bred for cultivation in the highlands of Aurangabad and Adilabad districts.

Trial of four improved strains II-44-1231, II-44-1244, II-45-2204 and Gao. 12F-2-18 against Gaorani 12 and the local, at Parbhani on two types of soil, viz., medium heavy black soil and light soil, showed that all the improved varieties were on par with Gaorani 12 and local, in respect of yield, early maturity and ginning. Trials of these varieties against local, Gaorani 12 and Virnar conducted at 7 places in Parbhani, Aurangabad and Bhir districts showed that II-45-2204 and II-44-1244 were suitable to Parbhani and Aurangabad districts, while II-44-1244 alone was adopted to conditions in Bhir district.

MYSORE

1. **Scheme for breeding long staple American cotton in Mysore State.**—This scheme, which is an offshoot of the Mysore (Doddahathi) cotton scheme, was sanctioned by the Committee in January, 1944, and put into operation on the 1st November, 1944.

The objects of the scheme are (a) the acclimatisation and breeding of Egyptian and Sea Island cotton and (b) the testing in large scale trials, of Mysore-American strains evolved under the Doddahathi scheme.

Owing to uneven and untimely rainfall received during the year, the crop was a partial failure in certain areas. The results of a varietal trial conducted with seven Mysore-American cotton strains using Co.4 as the control at the Visweswariah Canal and Babbur Farms showed that M.A.5

was the best of the lot combining the high yield, long staple and high ginning outturn. The study of the interspecific material from Surat is reported to have not given any promising types under Mysore conditions. Laxmi variety from Bombay-Karnatak was tested along with M.A.5 and was found to give a slightly more yield than that of M.A.5.

It is reported that the optimum period of sowing of the Egyptian and Sea Island cottons on the Visweswariah Canal Farm was during the months of October and November. The Egyptian variety Giza 12, sown in October, is stated to have given the highest yield. At the Babbur Farm, on the other hand, May and June were found to be best months for sowing Egyptian varieties. The yielding capacity of these varieties is, however, dependent on the receipt of the monsoon during August/September. Both Egyptian types Giza 7 and Giza 12 were found to be suitable for the area.

The newly imported Egyptian varieties, viz., Giza 36, Giza 39, Giza 29, Giza 26, Zagora, were tested against Giza 7 under irrigated conditions and the results showed that Giza 7 and Giza 36 (Menoufi) were the best.

The results of the bulk trial of Sea-Island cotton, planted in October and November, 1950, are stated to have confirmed the previous observations that the October sowing gives higher yields than that done in November. Further, Sea-Island trials were also undertaken in Malnad areas receiving 80-90" of rain annually. These are stated to be a failure except at one centre near Belur, where the crop was given two irrigations during the period of drought.

RAJASTHAN

1. **Scheme for improvement of cotton in Mewar.**— This scheme commenced working on the 16th June, 1948, with a view to evolve a strain of American cotton capable of spinning 24's.

The results of yield trials of the new varieties conducted during the year at 5 centres, viz., Udaipur, Chitorgarh, Kapasin, Bhilwara and Rajpura on the cultivators' fields showed that M.48-16 and M.48-46 were on a par with Indore 1, in respect of yield. Other trials conducted at Udaipur during the season showed that M.48-4, M.49-191, M.49-350 and

three progenies from hybrids of $4 \times \text{MZ561}$ viz., M.50-707, M.50-70 and M.50-709 were promising.

MADHYA BHARAT

1. **Institute of Plant Industry, Indore.**—Work for breeding superior varieties of cotton for Malwa was continued during the year under report at the Institute of Plant Industry, Indore.

During the year, a varietal trial was conducted with 7 hybrid strains isolated at the Institute together with two controls viz., Malvi 9 and Bhoj. The results did not indicate any appreciable difference amongst different strains tested. Amongst the American strains, four of the new seven strains were promising for cultivation on *adhan* lands of Malwa. At Badnawar, 4 more new selections, viz., B.48-8, 37, B.49-95 and B.49-117 have given significantly higher yields than Indore 2.

Large populations of interspecific hybrid material involving different crosses between the cultivated and wild types and the Surat hybrid material were examined with the object of Isolating desirable combinations of characters.

Manurial trials with graded doses of nitrogen in the form of Ammonium sulphate, groundnut cake and Chilean Nitrate showed that the rate of increase of yield was directly proportional to the rate of nitrogen applied. A comparison of the three different sources of nitrogen showed that ammonium sulphate gave the highest yield followed by Chilean Nitrate and groundnut cake.

2. **Scheme for improvement of Nimar cotton in Madhya Bharat.**—This scheme was started in June, 1948, with a view to evolve a strain of cotton that would combine the yielding capacity of the local Nimari variety with the ginning percentage, spinning equality and wilt-resistance of Jarila.

During the year, three new strains viz., D.46-5, D.47-20 and D.47-21 were tested on the cultivators' fields against Jarila, Local and Buri 107 at five centres in the Nimar district and on Khargone Farm, D.46-5 was again found to maintain its superiority. As a result of other trials, it was noted that another strain D.48-154 was also promising and deserved further trials in the district.

CHAPTER IV

EXTENSION WORK IN THE STATES

The results of the crop improvement work financed by the Committee are carried to the cultivators through the agency of various seed distribution and extension schemes that function in different States. The multiplication and distribution of improved seed on a large scale forms a real link between the experimental station and the cotton farmer. This work has been greatly intensified in the recent years. The total amount so far spent by the Committee on such schemes amounts to some Rs. 28.76 lakhs.

During the period under review, there were 16 seed distribution and extension schemes in operation in the various cotton growing States. A brief report on the working of these schemes is given below :—

BOMBAY

(i) **Jarila seed distribution and extension scheme.**—This scheme was sanctioned in March, 1937 with the object of replacing Banilla variety in the Khandesh tract over an area of 1,55,000 acres with Jarila which is wilt-resistant. Subsequently, the target of area was raised to 5,00,000 acres. The object of the scheme during the present extension period is to test 197-3, a newly developed superior strain now named 'Virnar', under different conditions of soil and climate, to arrange for the carrying out of mill spinning tests of this new variety in comparison with Jarila, and to multiply the pure seed of both the varieties, viz., Jarila and Virnar.

The progress made by the scheme during the last four years is shown below :—

Year	Quantity of seed distributed under the scheme (maunds)	Estimate of area covered (Acres)			Estimated additional income			Remarks	
		Departmental seed	Non-Departmental seed	Total	Per acre	Total			
					Rs. a.	p.	Rs.		
1948-49	28,113.2	1,24,131	1,23,608	2,47,739	13	4	0	32,82,542 *	* As Jarila covered whole of the Khandesh tract comparative information of Local & Jarila is not available
1949-50	25,101.0	92,458	1,34,727	2,27,185	*		*		
1950-51	19,737.4	90,000	1,00,000	1,90,000	*		*		
1951-52 Jarila	69	32,139	1,00,000	1,32,139	@		@		
Virnar (197-3)	11,298	52,214	.	52,214	84	7	3	45,78,141 @	@ The new improved variety virnar is compared with old improved type Jarila.

In view of the suspension of the Khandesh Cotton Control Act, it is not now compulsory to grow the improved variety of cotton alone and as such, there was a considerable area under non-descript types, particulars of which are not available.

An area of 5 acres under nucleus stage of Virnar was sown on Jalgaon Farm and 378 lbs. selfed seed was produced for further multiplication in stage I. The selfed seed produced last year was sown on 10 acres on Jalgaon Farm in stage I, from which 42 mds. seed was produced for further multiplication in stage II.

The area under II stage was 318 acres at Mamurabad in East Khandesh and 73 acres at Dhulia in West Khandesh. The total quantity of seed produced from II stage was 1959 mds. The ginning percentage of the Farm produce was 39.2% and that of I and II stage at Mamurabad was 38.4% and 39.7% respectively.

The Cotton Transport Act, 1923, alone was in force in Khandesh area during the year under report. Since the whole Khandesh Cotton Tract is likely to be covered with Virnar seed in 1952-53, proposals have been submitted for reimposition of the Bombay Cotton Control Act, 1942, in the Khandesh Cotton Tract including also Nandurbar and Taloda Talukas of West Khandesh district.

Virnar cotton seed has been stocked by the Agricultural Department as well as by the approved stockists to cover about 3,11,952 acres in 1952-53. Remaining area of about one lac acres out of the estimated acreage of 4½ lac in 1952-53, is likely to be covered by natural spread.

(ii) **Scheme for cultivation of 1027 A.L.F. cotton in Nawapur Taluka.**—The work of this scheme was started in May, 1942, with the object of covering 25,000 acres in Nawapur Taluka with 1027 A.L.F. The present object of the scheme also covers the investigation of the possibility of replacing 1027 A.L.F. by Suyog or any other high ginning, equally good variety. The quantity of seed distributed under the scheme and the area

covered by it in 1951-52 in comparison with the corresponding figures for the previous two years are shown below :—

Year	Quantity of seed distributed under the scheme (maunds)	Estimate of area covered (Acres)			Estimated additional income		Remarks
		Departmental seed	Non-Departmental seed	Total	Per acre	Total	
					Rs.	Rs.	
1949-50	1836.2	8,600	..	8,600	*	*	*As the whole area has been covered with 1027 A. L. F., no comparative figures are available.
1950-51	1739.4	4,739	4,001	8,740	*	*	
1951-52	1982.6	..	..	25,000	*	*	

Owing to bollworm attack after the flowering period, and paucity of rains during the season, the staple and quality were poor as compared to the previous seasons.

During the year under report, six hundred and thirty two 'agmark' certified bales in all were produced.

The results of the comparative yield trials confirmed the previous season's results that 2087 was the most suitable variety for replacing 1027 A.L.F. in Nawapur Taluka. It is not only a better yielding variety than 1027 A.L.F. but is superior to it in the matter of ginning, spinning and resistance to *fusarium* wilt as well.

The new strain 2087 has been grown on an area of 41 acres at Nawapur and the resulting 6,000 lbs. of seed of the strain is proposed to be distributed during the ensuing year in Nawapur to cover an area of about 500 acres.

(iii) **Scheme for multiplication and distribution of Suyog cotton in Surat tract (South of river Narmada).**—The work of this scheme was started in April, 1945, with the object of replacing 1027 A.L.F. and 1A cottons by Suyog over an area of 2 lakh acres in the Surat tract of Bombay State lying south of river Narmada, excluding Nawapur taluka of West Khandesh district. The target area has since been increased to 3.6 lakh acres owing to merging of Baroda, Rajpipla, Sachin and Bansda States in

Bombay. The progress of seed distributed and the area covered during the past four years is shown in the following statement :—

Year	Quantity of seed distributed under the scheme (maunds)	Estimate of area covered (Acres)			Estimated additional income		Remarks
		Departmental seed	Non-Departmental seed	Total	Per acre	Total	
					Rs.	Rs.	
1948-49	14,139.8	80,000	..	80,000	*	*	*It is stated that since the introduction of Suyog, the entire cotton area is under 'Suyog' so no comparative data for local variety are available.
1949-50	30,913	2,72,947	..	2,72,947	*	*	
1950-51	26,237	3,43,000	..	3,43,000	*	*	
1951-52	32,642	4,75,000	..	4,75,000	*	*	

The results of the large scale replicated trials conducted during the year in the tract again confirmed that strain "2087" was higher yielding and more resistant to *fusarium* wilt than Suyog. It was, however, on a par with it in respect of ginning percentage and staple length, but possessed a higher spinning capacity. The strain was grown during the year on 345 acres in the wilt infected area of Hansot, Ankleshwar and Olpad talukas and the resulting seed is expected to cover an area of 4,500 acres next year. This new strain was appreciated by cultivators.

(iv) **Scheme for multiplication and distribution of "Vijaya" cotton in Middle Gujarat.**—This scheme commenced working in December, 1943, with the object of replacing local Broach and B. D. 8 cottons by 'Vijaya' cotton in the Narbudda-Mahi and the Mahi-Sabarmati zones of Middle Gujarat.

The summary of the progress made for the last four years under the scheme is given below :—

Year	Quantity of seed distributed under the scheme (maunds)	Estimate of area covered (Acres)			Estimated additional income		Remarks
		Departmental seed	Non-Departmental seed	Total	Per acre	Total	
					Rs.	Rs.	
1948-49	19,370	1,04,350	1,10,216	2,14,566	*	*	*There being no local cotton to compare with, the estimated gross extra income to the growers could not be calculated.
1949-50	13,429.7	1,00,085	2,08,185	3,08,270	*	*	
1950-51	24,948	1,00,000	3,17,558	4,17,558	*	*	
1951-52	31,410	2,40,000	2,47,000	4,87,000	*	*	

The year under report was characterised by droughtly conditions from the beginning itself and as such both the kapas yield and the quality of the produce were poor.

The total estimated area under cotton in Middle Gujerat during the year was 5,17,206 acres of which about 30,000 acres in the following regions remained under cottons other than Vijaya :—

	Acres
(a) Bhal tract of Cambay taluka	10,000
(b) Matar taluka, Kaira district	6,000
(c) South Daskroi and Dehgam talukas	4,000
(d) Jambusar taluka, Broach district	10,000
	<hr/> 30,000

In the first three regions, the cultivators preferred to grow the closed-boll types while in the fourth they liked to grow 'Kaliu' which is more resistant to root rot.

The Agriculture Department controlled an area of 59,275 acres, under stages II to VI, the seed of which was distributed through the different cotton sale societies under the supervision of the Agriculture Department.

In 9,126 full pressed bales of Vijaya cotton from the controlled area were certified for purity. However, no premium was allowed for these certified bales of Vijaya cotton as the quality control had been introduced by Government during the season.

(v) **Scheme for multiplication and distribution of Vijaya cotton in Baroda.**—This scheme was put into operation in April, 1944, with a view to establish Vijaya cotton (seg i-2 only) in the whole of the Broach cotton tract in Baroda district, lying between the Narmada and Mahi rivers.

The progress made under the scheme for the last three years is shown as below :—

Year	Quantity of seed distributed under the scheme (maunds)	Estimate of area covered (Acres)			Estimated additional income		Remarks
		Departmental seed	Non-Departmental seed	Total	Per acre	Total	
					Rs	Rs.	
1949-50	21,20,000	2,64,500	..	2,64,500	23	60,83,500	† The entire cotton area of the Baroda district was under Vijaya since 1944. Comparative figures of deshī were not available.
1950-51	25,64,520	3,01,750	..	3,01,750	†	†	*Figures not available.
1951-52	34,37,140	3,80,173	..	3,80,173	*	*	

During the season under review which was characterised by unfavourable droughty conditions, seed of Vijay cotton was multiplied on 39,196 acres in different stages of controlled area in the district. This controlled area was rogued and inspected for purity by the departmental staff. The seed from this area is expected to be sufficient to cover the entire area of the district next season.

The cultivators obtained premia ranging from Rs. 5 to Rs. 15 per *Bhar* (960 lbs.) of certified *kapas*. On account of the new introduction of quality control, no special premium of either Agmarked or certified full pressed bales allowed by Government.

(vi) **Scheme for multiplication and distribution of Kalyan cotton seed in Wagad tract of Bombay State.**—Schemes for multiplication and distribution of Kalyan (K.72-2) cotton in Ahmedabad district for five years and Mehsana district for three years and eight months were sanctioned by the Committee in February, 1947 and March 1948, respectively.

During the year under report, these were amalgamated into one scheme with the object of multiplication and distribution of the pure seed of Kalyan Cotton in the Wagad tract of Ahmedabad and Mehsana districts of North Gujarat.

The spread of Kalyan cotton in Wagad tract of Ahmedabad and Mehsana districts from year to year as against the actual targets of the scheme and the quantity of improved seed distributed are as under :—

Year	Area proposed to be covered as per plan of the scheme in acres		Area actually covered in acres		Seed distributed in lbs.		Total Lbs.
			(Kalyan)		By Department	Through Agents	
	Ahmedabad	Mehsana	Ahmedabad	Mehsana			
1947-48	995	Nil	1,914	Nil	36,200	..	36,200
1948-49	7,945	241	12,057	26	22,490	3,11,070	3,33,560
1949-50	53,525	2,411	34,025	1,375	49,395	7,05,944	7,55,339
1950-51	2,44,310	24,111	73,393	26,552	..	20,35,648	20,35,648
1951-52	5,75,110*		2,80,935*		..	56,00,240	56,00,240

* Amalgamated Scheme

During the current season about 87,500 Bombay maunds of Kalyan cotton seed will be distributed which would cover an area of about 4,00,000 acres during the year 1952-53, which would represent 67.3 per cent. of total area under cotton in the tract as against 47.3 per cent. in 1951-52.

About 40,000 bales of Kalyan cotton are expected to be produced during the current season. The bales marketed fetched a premium of Rs. 100 to Rs. 120 per candy of lint over local Wagad.

The enhanced value fetched by the new strain is Rs. 15 per acre. The gross extra income to growers of Kalyan cotton is estimated at Rs. 42,14,025.

(vii) **Scheme for multiplication and distribution of Jayadhar and Laxmi cottons in Bombay-Karnatak.**—This scheme was put into operation in March, 1950, for replacing the existing varieties of Jayawant and Gadag No. 1 by the new strains Jayadhar and Laxmi.

The work during the year under review covered the distribution of the seed of all four varieties because the seed of the new types was insufficient to cover the entire area under cotton.

The progress made under the scheme during the last two years is summarised in the following table :—

Year	Variety	Seed distributed in lbs.	Area covered (acres)			Premium realised per <i>Naga</i> of 1344 of kapas	Seed to be stocked for the year 1951-52	Area estimated to be covered during 1951-52
			Departmental seed	Non-Departmental seed	Total lbs.			
Rs.								
1950-51	Jayawant	36,11,860	3,46,099	2,91,314	6,37,413	From 10 to 15	..	..
	Jayadhar	20,59,960	1,97,811	42,389	2,40,200	From 25 to 90	105,86,660	10,00,000
	Gadag No. 1	3,51,900	35,421	97,350	1,32,771	From 15 to 30	..	..
	Laxmi	9,81,400	98,034	2,000	1,00,034	From 150 to 300	16,00,000	1,60,000
1951-52	Jayawant	4,78,100	45,404	35,268	80,672	.	..	..
	Jayadhar	66,60,640	6,00,114	62,010	6,62,124	From 15 to 20 over ungraded Jayadhar	..	..
	Laxmi	34,55,100	3,47,530	33,487	3,81,017	From 50 to 95 over ungraded Laxmi	..	..

In order to maintain the purity of seed, reserved areas of 1,04,319 acres of Jayadhar and 56,040 acres of Laxmi were organised in compact blocks on cultivators' fields in 13 centres under different generations. Steps were taken to issue purity certificates and till 12th April, 1952, 35,618 bales of Jayadhar cotton and 20,290 bales of Laxmi cotton were certified.

The average premium realised in auction sales per Naga of 1344 lbs. for the graded kapas over ungraded produce of Jayadhar was Rs. 15 to Rs. 40 and that for Laxmi was Rs. 50 to 95 in the different markets of the Karnatak.

MADHYA PRADESH

(i) **Scheme for distribution and marketing of Jarila cotton in Madhya Pradesh.**—A scheme for the distribution of Jarila seed in Buldana district has been in operation since 1944.

The summary of progress made during the last four years under the scheme is given below :—

Year	Quantity of seed distributed under the scheme (B. Mds.)	Estimate of area covered (acres)			Estimated additional income		Remarks
		Departmental seed	Non-Departmental seed	Total	Per acre	Total	
					Rs. a. p.	Rs. a. p.	
1948-49	4,588	7,911	4,59,225	4,67,136	1/12/3	8,31,610/-	*Cultivators in Malkapur taluka
1949-50	2,449	13,500	11,30,605	11,44,105	5/9/7	24,54,165/9/9	however are reported to have
1950-51	6,919	17,474	4,06,623	4,24,097	2/8/11	10,84,490/13/6	obtained a profit of Rs. 96,060/12/6
1951-52	6,900	35,805	4,08,166	4,43,971	12/5/9 Profit	†	†Not given.

The total area in Buldana district under Jarila during the year under review was 4,43,971 acres out of the total cotton area of 482,907 acres *i.e.*, about 91.9 per cent. of the cotton area in the District was under Jarila.

MADRAS

(i) **Scheme for maintenance of nucleus of pure seed of improved varieties of cotton in Madras State.**—This scheme was sanctioned by the Committee in January, 1938, for a period of five years and came into operation on the 12th September, 1938. During the year under report, the area selfed and the quantities of selfed seed produced of each variety are given below :—

Name of variety	Area selfed	Quantity of selfed seed produced		How disposed of
		Acres	Lbs.	
Co. 2	0.56	92		After reserving sufficient selfed seeds for the nucleus area of 1952-53 the rest of the seeds was transferred to the respective officers in charge of seeds farms for sowing the inner area in 1952-53.
Madras Uganda 1	0.94	134		
K. 2	2	140		
N. 14	2	24.5		

(ii) **Scheme for multiplication and distribution of seed of C. 1 and 336B cotton in Guntur district of Madras State.**—This scheme was sanctioned by the Committee in March, 1948, and it was commenced on the 26th August, 1948. The present objects of the scheme are (i) to distribute C. 1 on as large a scale as possible in Guntur district of Madras State and (ii) to replace C1 by 336B in gradual stages.

The progress made under the scheme for the last four years is given below :—

Year	Quantity of seed distributed under the scheme	Estimate of area covered (Acres)			Estimate of additional income	
		Departmental seed	Non-Departmental seed	Total	Per acre	Total
	Lbs.				Rs. a. p.	Rs.
1948-49	1,835	160	840	1,000	18 0 0	18,000
1949-50	8,100	800	200	1,000	19 8 0	19,500
1950-51	24,615	2,800	6,000	8,800	19 8 0	1,71,600
1951-52	75,358	8,800	1,000	9,800	11 0 0	1,07,800
C1						
336B ..	..	9	..	9	5 0 0	45

The quantity of seeds estimated to be procured during 1951-52 for C1 is 33 tons.

During the year under report, the prices of seed were reported to have reached low levels owing to general slump in market, lack of local demand and large carry-over of seed by the trade. Accordingly, Government allowed the purchase of kapas at reasonable rates for the supply of lint to *Khadi* department and procure pure seed for distribution. A premium of Rs. 5 per candy of 500 lbs. of kapas is proposed to be paid in the system of procurement through department.

(iii) **Scheme for multiplication and distribution of Westerns-1 cotton in Madras State.**—This scheme was put into operation on 1st July, 1950, and aimed to cover an area of 10,000 acres in Bellary district, Madras State, during 1951-52, with seed of Westerns 1 obtained from the previous years crop sown with departmental seed.

In 1950-51, an area of 6,500 acres was grown with Westerns-1 cotton under seed farm conditions and 10,069 maunds of Westerns-1' cotton seed were procured against the target of 30,305 maunds. During the year under

report which was characterised by drougthy conditions and whereby the cotton yields were reduced by about 35 per cent. an area of 63,514 acres had been covered by the improved seed distributed departmentally against the area of 10,000 acres programmed for. All the lint was purchased by Messrs. Rallis (India), Limited and the premium was paid to the lint from the seed farm of Rs. 10 per bale of 392 lbs. over the local. The gross extra income to growers as a result of this scheme is estimated at Rs. 1,90,000.

EAST PUNJAB

(i) **Scheme for multiplication and distribution of L. S. S. American cotton in Ferozepore district.**—This scheme was sanctioned by the Committee in November, 1947, for a period of five years and was put into operation on the 17th October, 1948. Its object is to establish L. S. S. cotton in the Ferozepore district.

The progress made under the scheme for the last three seasons is shown below :—

Year	Quantity of seed distributed under the scheme (Mds.)	Estimate of area covered (acres)			Estimated additional income		Remarks
		Departmental seed	Non-Departmental seed	Total	Per acre	Total	
					Rs. as. ps.	Rs.	
1949-50	8,506	52,590	32,470	85,060	*	*	*First year of the
1950-51	14,850	66,872	81,628	148,500	74 8 9	49,85,099	working of the
1951-52	16,244	85,780	76,660	162,440	71 11 0	60,96,277	scheme.

It will be seen that out of the total area of 2,44,300 acres under cotton, in the Ferozepore district, 1,62,500 acres were covered by L. S. S. during the current year. The Agriculture Department purchased 9,230 maunds of L. S. S. seed of very high purity for distribution in the coming season.

In order to popularise L. S. S. and to encourage cultivators to put the largest possible area under this variety, the marketing of kapas of L. S. S. from rogued area was arranged by inviting tenders. Though this variety was under Price Control, yet growers were able to get good price for their kapas of rogued area. The premium obtained for rogued area produce ranged from annas 12 to Ps. 1-11-0 per maund of kapas over market L. S. S.

(ii) **Scheme for multiplication and distribution of 216F cotton seed in Hariana tract of East Punjab.**—This scheme was sanctioned by the Committee in July, 1949, for a period of five years and put into operation on the 15th July, 1950. Its object is to multiply and distribute seed of 216F American cotton in the South-East 'Hariana' tract of Punjab State where it could be grown on 1,11,000 acres under canal irrigation instead of short staple **deshi** cultivated at present.

The progress made under the scheme during the last two years is shown below :—

Year	Quantity of seed distributed under the scheme (Mds.)	Estimate of area covered (acres)			Estimated additional income		Remarks
		Departmental seed	Non-Departmental seed	Total	Per acre	Total	
1950-51	1,300	6,600	..	6,600	Rs. 223	Rs. 14,71,800	
1951-52	8,387	27,500	7,500	35,000	184	64,40,000	

Out of the total irrigated cotton area of one lakh acres in this tract, 35,000 acres have been covered by 216F during the year under review. It is hoped that 80 to 90 per cent. of the total area in the tract would come under this strain during the next few years.

8,755 maunds of seed were procured from stages I to V, out of which 4,000 maunds of seed were sent to Madras Government, leaving a balance of 4,755 maunds for distribution in the State, as against the original procurement target of 5,000 maunds of seed. The demand for 216F seed was so keen that an additional quantity of 1,732 maunds of unrouged seed had to be procured to meet the requirements of the cultivators. In addition, another quantity of 1,900 maunds of 216F seed have been sold by private agencies.

The marketing of kapas of 216F from rogued area was arranged by holding auction at Hansi under the direct supervision of the departmental staff. Although the price of 216F kapas was very attractive in the beginning of the ginning season, it sagged down to a low level at the close of the season. The big slump in the price of this cotton affected its sale very adversely, so much so that even the grant of a subsidy of Re. 0-2-6

per lb. of yarn spun in Classes VII and VIII did not make the purchase of 216F cotton attractive to the millowners. It is estimated that about 9,000 bales out of the total production of 18,500 bales of this variety during 1951-52 season, are lying unsold with the ginning factories and farmers.

HYDERABAD

(i) **Scheme for multiplication and distribution of Parbhani-American cotton seed in Adilabad district of Hyderabad State.**—This scheme was put into operation in May, 1950, for the purpose of replacing *deshi* cotton grown in this tract by the improved, superior spinning variety Parbhani-American.

The progress made under the scheme during the last two years is shown below :—

Year	Quantity of seed distributed under the scheme (Mds.)	Estimate of area covered (acres)			Estimated additional income		Remarks
		Departmental seed	Non-Departmental seed	Total	Per acre	Total	
1950-51	8,936.25	58,000	Not available	58,000	Rs. 10	Rs. 5,80,000	First year of the scheme.
1951-52	14,064	94,000	Do.	94,000	10	9,40,000	

Of the proposed acreage of 1,20,000 proposed to be covered by the improved type—'Parbhani American cotton' under the scheme, an area of 94,000 acres had been covered during the year under review.

A premium of Rs. 5 has been paid per palla (3 mds.), of Parbhani American kapas over those of local *deshi*.

(ii) **Scheme for multiplication and distribution of Gaorani 12 cotton seed in Hyderabad State.**—This scheme was started on the 11th October, 1950, with a view to arrange for the production and distribution of pure pedigree seed of Gaorani 12 in the south and western portions of Gaorani Protected Area, and also to organise the marking of its produce.

A summary of the progress of work during the last two years is given below :—

Year	Quantity of seed distributed under the scheme (Mds.)	Estimate of area covered (acres)			Estimated additional income		Remarks
		Departmental seed	Non-Departmental seed	Total	Per acre	Total	
					Rs.	Rs.	
1950-51	5,193	26,000	..	26,000	..	..	This is the first year of the scheme
1951-52	10,960	..	..	56,000	..	..

4,346 bales of Gaorani 12 were pressed under the supervision of scheme staff at Latur and Udgir. A premium of Rs. 10 per palla (3 maunds), over local Bani for general area produce of Gaorani 12 and Rs. 15 for the reserve area was obtained. The estimated additional gain which accrued to the cultivators growing G. 12 cotton amounted to approximately, Rs. 2,41,670.

RAJASTHAN

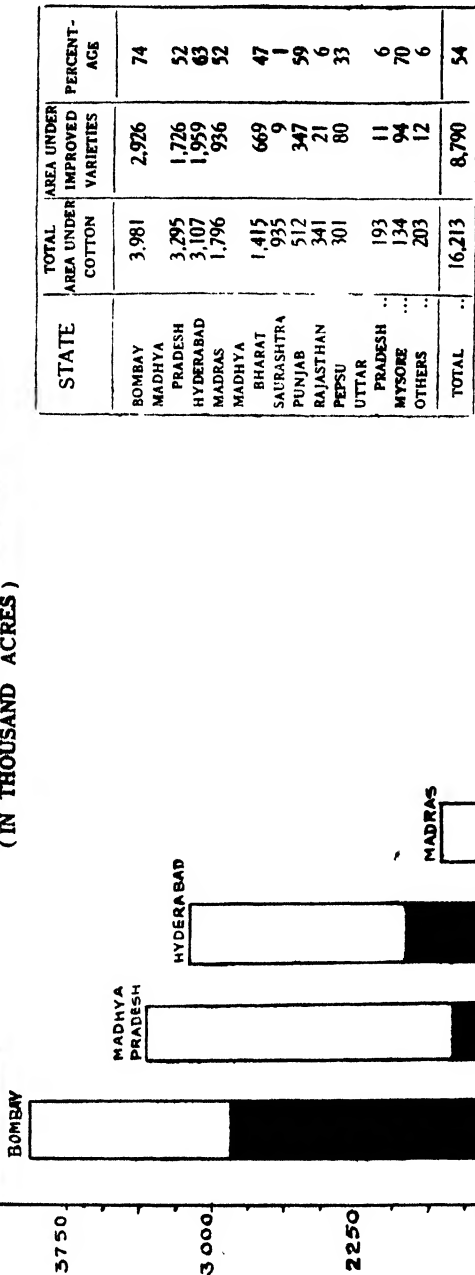
(i) **Scheme for multiplication and distribution of Indore—1 cotton seed in Rajasthan.**—This scheme was sanctioned by the Committee in September, 1948, for a period of four years and was put into operation in May, 1951.

During the year under review, the pre-monsoon sowings were done in time in the month of May and the crop was in good condition. Sowing of barani cotton, however, were delayed due to the late receipt of the monsoon. The year proved to be very droughty having received less than half the normal precipitation and in consequence the yields of both irrigated and barani crops were very much below normal.

During the year under report, 629 maunds of seed of Indore 1 were distributed to the cultivators. The produce from the rogued area obtained a premium of Rs. 2 per mani (6 maunds).

AREA UNDER IMPROVED VARIETIES OF COTTON — 1951-52

(IN THOUSAND ACRES)



CHAPTER V

PROGRESS IN THE INTRODUCTION OF IMPROVED VARIETIES OF COTTON

The progress made during the year in matter of introduction of improved varieties of cotton in the different major cotton growing States is summarised below :—

BOMBAY STATE

(a) **North Gujerat (Wagad Tract).**—The total area under cotton in the tract in 1951-52 was 5.94 lakh acres as against 5.28 lakh acres in the previous year. Kalyan, an improved variety of wagad cotton, is being distributed in the tract and during the year under report, it covered an area of 2,80,935 acres as compared with 99,946 acres in 1950-51. Thus, the area covered during the year by the improved variety constituted 47.3% of the total cotton area in the tract as against 18.9% in 1950-51. It is reported that a premium of Rs. 100 to 120 per candy of lint was paid for Kalyan over local Wagad during the year under report. As such the growers of Kalyan cotton are estimated to have earned a gross extra income of Rs. 42.14 lakhs during the current year, against Rs. 19.24 lakhs in the previous season.

(b) **Middle Gujerat.**

(i) **Broach Tract.**—The total area under cotton in 1951-52 in this tract comprising the districts of Kaira, Sabarkantha, Panch Mahals and part of Broach district north of the river Narmada, and parts of Ahmedabad district was 4.83 lakh acres, being about 14.84% of the total cropped area. The improved type Vijaya (Segragate 1-2) is under distribution and covered 4.83 lakh acres in 1951-52 as against 5.05 lakh acres in 1950-51. It will thus be seen that during the year 93.6% of the cotton sown in the tract was under improved variety.

Owing to quality control during the season, preference is said to have been given to certified bales over uncertified bales and it is reported that Rs. 10 per candy was paid as premium for certified bales in 1950-51. The estimated gross extra income to the cultivators of Vijaya cotton was approximately Rs. 48 lakhs.

(ii) **Baroda district.**—The total area under cotton in the Baroda district in 1951-52 was 3.92 lakh acres and practically the whole area was

covered by the improved variety Vijaya which is also being distributed in Middle Gujarat. A small area of 1,798 acres was also stated to have been cultivated with Co.4/B.40.

It is stated that agmarked full-pressed bales from certified seed cotton were in active demand, as compared with the trade bales. The total estimated gross extra income to the cultivators of Vijaya cotton in Baroda district was of the order of Rs. 40 lakhs.

(c) **Surat tract (South Gujarat).**—The total area under cotton in the tract consisting of Surat district and adjoining areas was 4.75 lakh acres in 1951-52 as against 4.65 lakh acres in the previous year. The improved variety under multiplication and distribution in the zone was Suyog, and the area covered by it in 1951-52 was 4.75 lakh acres, compared with 3.43 lakh acres in the previous season. The entire cotton area was thus covered by this improved variety, and the gross extra income earned by the growers of the tract as a result of cultivating this improved strain may be estimated at Rs. 47.5 lakhs in 1951-52.

(d) **Nawapur tract.**—The Nawapur taluka of West Khandesh district grows Surti 1027 A.L.F. During the year under report, the total cotton area in this tract was 25,885 acres as compared to 23,609 acres in the previous year. The entire area of 25,885 acres was covered by the improved seed of 1027 A.L.F. and the gross extra income to the cultivators of 1027 A.L.F. amounted to Rs. 2.59 lakhs.

(e) **Khandesh tract.**—The total cotton acreage in 1951-52 was 4.155 lakh acres, compared with 3.03 lakh acres in 1950-51. The improved varieties Jarila, Virnar and Co.4/B.40 were under distribution in this tract, and it is reported that the total area covered by them was 1,87,166 acres, which constitutes 40 per cent. of the total cotton acreage in comparison with 1,93,519 acres which constituted 63.8% of the total cotton acreage during 1950-51. The total extra income obtained by the grower during the year is stated to be Rs. 18.7 lakhs.

(f) **Kumta-Dharwar tract.**—The total area under cotton in this tract in 1951-52 was 10.85 lakh acres against 11.13 lakh acres in 1950-51. The total area covered by the improved varieties, viz., Jayawant, Jayadhar, Gadag No. 1, and Laxmi, was 10,73,262 acres in 1951-52 and the gross extra income earned by the cultivators of these improved varieties was of the order of Rs. 107 lakhs.

MADRAS STATE

(a) **Cambodia Cotton.**—The area under Cambodia cotton during 1951-52 is estimated at 2,70,800 acres compared with the finally recorded area of 2,36,400 acres during the previous year.

During the year, the improved Cambodia strains covered 1,89,378 acres which form 69.9% of the estimated area under Cambodia in the current year as compared to 65% in the previous year.

Among the different Cambodia strains, Cambodia—2 continues to have the largest spread, its present acreage being 1,08,111. acres constituting 39.9% of the total Cambodia area as against 39.2% recorded for the previous year.

Madras Uganda 1 is gaining popularity amongst the cotton cultivators due to impetus given by the Government by the initiation of the seed distribution scheme in winter and by virtue of its being excluded from price control. Its present acreage is 66,815 acres forming 24.7% of the total area under Cambodia as against 20% during the previous year. The increase is noted specially in Salem, Coimbatore, Tiruchirapalli and Chingleput Districts.

Strains 920, 4,463 and Cambodia 3, the multiplication and distribution of which had been discontinued by the Agricultural Department in favour of Madras Uganda 1 are going out of cultivation.

A notable feature during the year under review is the extension of short duration American cotton P.216F in the rice fallows especially in Tanjore and South Arcot Districts and as a mixed crop with Ragi, Groundnut and Chillies in North Arcot, Chittoor and Nellore. A total area of 14,010 acres constituting 5.1% of the Cambodia area was under this strain. It was observed that this variety finished its harvest within five months after planting and yielded upto 1,000 lbs. of seed cotton as a pure crop under good farming conditions.

(b) **Tinnevellies.**—The total area under Tinnevellies is estimated at 5,08,600 acres for the year 1951-52 as compared to the finally recorded area of 4,97,100 acres in the previous year. The estimated acreage of 2,40,014 acres under the improved Karunganni strains K.2 and K.5 works to 47.1% of the total area under Tinnevellies and Karunganni area as compared to

49% recorded for the previous year. The two superior strains, viz., K.2 and K.5 have completely replaced K.1 and K.2 which had a spread of only 116,915 acres during last year has increased to 150,150 acres during 1951-52 and K.5 covered 89,864 acres during the year.

(c) **Salems.**—During the year under report, area under Salems increased from 11,700 acres to 12,800 acres and the strains K.5 and H.420 occupied 1950 and 1452 acres.

(d) **White and Red Northern.**—The acreage under this cotton increased from 116,000 acres in 1950-51 to 1,18,000 in 1951-52. However, the area under N.14, the unproved variety for this tract decreased from 20,550 acres to 20,200 acres.

(e) **Westerns.**—The area under Westerns cotton has increased from 53,600 acres in 1950-51 to 545,000 in 1951-52. The improved strain Westerns—1 occupied an area of 435,296 acres which works out to 79.9% of the total area under Westerns.

(f) **Warangal and Coconadas.**—The estimated area under the cotton was 65,600 in 1951-52. The improved strains of C.1 and H.420 were cultivated during 1951-52 on 12,696 and 23,630 acres respectively. A start has been made to distribute C.2, a better strain than C.1 to gradually replace the latter.

(g) **Mungari.**—The estimated area under this variety which is confined to portions of Kurnool and Bellary districts is 272,000 acres as against 268,800 in 1950-51. A scheme for the multiplication and distribution of seed of 881F has been started in 1951-52 and it covered an area of 1,264 acres during the year.

(h) **Chinnapathi.**—The estimated area under this variety is 2,500 acres in 1951-52 the same as in 1950-51.

The estimated area under H.420, a strain recommended for mixed cropping with groundnut in this tract was 5,563 acres.

PUNJAB STATE

The total cotton acreage in 1951-52 in the State was 505,200 acres of which 296,400 acres were occupied by *desi* varieties and 208,800 acres by American varieties yielding 128,000 bales and 108,000 bales, respectively.

It may be added that 469,700 acres were under irrigated cotton and 35,500 acres under unirrigated cotton.

The position of improved varieties of cotton in different cotton tracts of the State during the year was as follows :—

(a) **Ferozepore District.**—This district represents the most important cotton growing tract of the State where L.S.S., occupies the entire area under American cotton. The Department of Agriculture distributed 8,529 maunds of seed of this variety, and 200 maunds M60A2, an improved *desi* type. The area under cotton in this district in 1951-52 was 244,200 acres of which the *desi* varieties occupied only 81,700 acres, producing 39,000 bales and the American varieties 162,500 acres with a production of 87,000 bales.

(b) **Haryana tract.**—(*Hissar, Rohtak, Karnal and Gurgaon districts*).—The tract is noted for growing successfully 216F American cotton and M60A2 *desi* type. The Department distributed 5,915 maunds seed of the former type and 408 maunds of the latter. The area occupied by these varieties was 31,900 with a production of 15,000 bales and 87,900 acres with a production of 38,000 bales for these two types respectively. The irrigated area under cotton totalled 112,100 acres and the unirrigated, 7,700 acres in this tract.

(c) **Central Districts.**—(*Amritsar, Jullundur, Ludhiana*).—The total area under cotton in this tract during 1951-52 was 109,200 acres of which 13,400 acres were under American cotton producing 6,000 bales and 95,800 acres under *Desi* with a production of 43,000 bales. The division of area under irrigated and unirrigated cotton in this tract was 106,500 and 2,700 acres, respectively. The Department distributed 1,400 maunds pure seed of L.S.S., 338 maunds seed of 320F, 445 maunds of 216F and 141 maunds of *mollisoni* type.

(d) **Sub-montane Tract.**—(*Gurdaspur, Hoshiarpur and Ambala and Kangra*).—These districts usually grow *desi* varieties of cotton which are mostly used for domestic purposes. The total area under cotton during the year was 32,000 acres of which *Desi* improved varieties, (*viz*, M60A2, M39 and 231R) and other local mixtures contributed 31,000 acres and L.S.S. American type 1,000 acres, the production of *desi* types being 8,000 bales. Only about 30 maunds seed of each of L.S.S. and 231R were distributed through the Department.

MADHYA PRADESH

The total area under cotton in the State during the year under report was 32.98 lakh acres against 27.76 lakh acres in the previous year. The improved varieties H.420 and Buri 0394 were distributed during the year in 4 tracts of the State, viz., (a) Nagpur-Wardha, (b) Akola-Amraoti (c) Ghat tract of Southern Berar, (d) Nimar tract. In addition, Buri 107 was also distributed in Akola-Amraoti and Nimar tracts. Jarila was distributed in the Buldana tract. The total area under these improved varieties in the whole State is said to be 17.26 lakh acres, constituting 52.5% of the total area under cotton. The gross extra income estimated to have been obtained by the cultivators of the different improved varieties in the various tracts in Madhya Pradesh is about 35 lakh rupees approximately.

UTTAR PRADESH

The total area under cotton in the year was 1.93 lakh acres, against 1.06 lakh acres in the preceding season. The improved varieties 35/1 a desi selection and 216F from Punjab were multiplied and distributed to the growers. The former variety was distributed extensively in Muzafar Nagar and Meerat districts, and to a small extent in the districts of Etawah, Etah, Saharanpur, Agra, Bijnor, Manipuri, Rampur, Moradabad, Farukabad and Aligarh, to replace the desi cotton area. 216F from Punjab was introduced for trial purposes in Etah and Aligarh for the first time. The area under improved varieties in 1951 was 11,616 acres as against 2,382 acres in the preceding season. Thus, the area under improved varieties, which was only 2.25% of the total cotton acreage in the State in 1950-51 rose to 6% in the year under report. The gross extra income earned by the cultivators of 35/1 strain is stated to be about Rs. 11,360, and that of 216F, at Rs. 47,600. The older varieties, viz., C.520, Perso-American and L.S.S. had also been distributed to a small extent.

HYDERABAD

The total cotton area during the year under report in the State was 31.37 lakh acres. The improved varieties under distribution were Parbhani American, Gaorani 6, Gaorani 12 and Jayadhar. The following table

gives the quantity of seed distributed, and the area covered by the different improved varieties under distribution during 1950-51 and 1951-52 :—

Strain	Quantity of seed distributed		Area covered	
	1950-51	1951-52	1950-51	1951-52
Parbhani American 1 ..	9,526	15,495*	60,040	97,692
Laxmi ..	..	1,500	..	9,000
Gaorani 6 ..	1,00,000	1,08,695	4,09,000	5,19,520
Gaorani 12 ..	6,760†	17,023	19,825	86,050
Jayawant ..	2,500	..	12,500	..
R. K. 19 ..	139	..	695	..
Jayadhar ..	..	5,700	..	33,000
Total ..	1,18,925	1,48,413	5,02,060	7,45,262

The area covered by the improved cotton strains was 23.6% of the total cotton area in the State. The total gross estimated extra income earned by the cotton growers of the State as a result of cultivating the improved strains was Rs. 42 lakhs.

MYSORE

The total cotton area under cotton in the State in 1951-52 was 1,33,999 acres, and formed 2.07% of the total cultivated area. The improved long staple American variety, M.A.5, was under distribution in Hassan, Mysore, Shimoga and Chikmagalur districts, while Madras Uganda, Co.4/B.40 was extended in Chittaldurg district. Selection 17 was cultivated in Chittaldurg and parts of Mysore district, Jayawant and Jayadhar in North Chittaldurg district, and Laxmi in parts of Shimoga district. The total area covered by the improved seed in the different districts was 96,539 acres, constituting 72% of the total cotton area, as compared with 65,301 acres in the previous season.

It is stated that the movement of inferior seeds and their cultivation in the protected zone was restricted by a Government notification issued under the Mysore Cotton Control Act, 1942, and its amendments. In order to ensure the quality and exclude the cultivation of inferior types of cotton. 42 villages in two revenue circles were declared to be an M.A.5 zone in

* The decrease in area under Parbhani American 1 in Aurangabad district is due to the decrease in demand from cultivators for this variety.

† 90 mds. departmental seed on 425 acres }
160 mds. other agencies on 800 acres } in Aurangabad District.

1951 and departmentally tested seeds were supplied to these lands. In 1951-52, 21 talukas were declared as protected zones where no other cotton except M.A.5 was allowed to be grown. The gross extra income by the growers of the improved varieties during the year under report is stated to be Rs. 18,04,940 in comparison with 16,08,530.

MADHYA BHARAT

The total cotton area in the year 1951-52 was 14.15 lakhs acres as against 15.31 lakh acres in the preceding season. The improved varieties Jarilla, Buri 107, Malvi 9, Broach, G.16, Indore 2 and 197-3 are stated to have covered 6,57,300 acres in the year as compared with 4,90,590 acres in the preceding year. The area under improved varieties was thus 41% of the total cotton area as against 32% in the previous season. The gross extra income earned by the growers of the tract as a result of cultivating the improved strains is stated to be Rs. 2½ lakhs only.

RAJASTHAN

The total area under cotton in the State during 1951-52 was 3.4 lakh acres of which 8,950 acres only were under improved varieties, viz., Indore 1 (Southern Rajasthan), C.520 (Eastern Rajasthan) and G-1 and 216F (Northern Rajasthan). The gross extra income earned by the growers as a result of cultivation the improved strains is estimated at Rs. 2,24,630 only.

PEPSU

The total area under cotton in 1952 was 3.2 lakh acres of which 80,000 acres were under improved varieties, viz., 216F, 320F and L.S.S. The gross extra income earned by the growers during the year was estimated at 50 lakh rupees, in comparison with Rs. 20 lakhs earned by them in 1950-51.

CHAPTER VI.

COTTON MARKETING, LEGISLATION AND OTHER PROTECTIVE MEASURES

(i) Cotton Import Policy

During 1951-52, the import policy was again governed by the cardinal principle of feeding our textile mills, particularly with regard to their needs of long staple cotton. The problem of obtaining supplies of foreign cotton required by the mill industry in India was rendered easier, as compared with the previous year, in view of a large cotton crop in the U. S. A. obtainable during the season and easier price position of the same. The Government of India issued freely import licences upto 9 lakh bales (500 lbs.), equivalent to about 11.25 lakh Indian bales, from the 1951-52 crop of U. S. cotton, stapling 1.1/16" and above. Licences were also granted for the import of raw cotton of staple length $\frac{7}{8}$ " and above, from soft currency countries, including East African cotton (covered by the bulk purchase agreement under which India expected to get about 150,000 bales of East African cotton of the 1951-52 season). Further, as per agreement with the Government of Sudan, the Government of India permitted Indian mills to import Sudan cotton to the extent of 60,000 bales. However, against these permits 12.35 lakh bales only of foreign cotton were imported during 1951-52. In May, 1952, it was notified that licences for the import of U. S. A. cotton would be valid for shipments up to the 31st December, 1952.

In view of the rapid fall in cotton prices, the Government of India published in April, 1952, detailed prices guaranteed by them for the imported American and African cottons in case the banks found it necessary to sell such cotton for recovering loans advanced against them.

(ii) Cotton Export Policy

The export policy of the country regarding cotton was again regulated in the light of the needs of the local mill industry. The surplus of cotton, mostly of short staple varieties left after meeting the needs of Indian industry, was allowed to be exported. Accordingly, a total quota of 302,000 bales, comprising 200,000 bales of Bengal Deshi, 65,000 bales of Dholleras types (including Kalagin and Mathio), 25,000 bales of Oomras (not exceeding 11/16" in staple) and 12,000 bales of Assam-Comilla, was permitted for

export during the year ending 31st August, 1952, of which about 200,000 bales were actually shipped out.

In so far as Assam/Comilla cottons were concerned, the Indian Central Cotton Committee recommended to the Government of India in December, 1951, that there should be no restriction on the export of this variety, either new or old, since the same was not being used in this country. The Government of India, however, permitted exports up to the limit of the quota fixed on presentation of shipping bills since it was not considered desirable to dispense with this licensing arrangement in view of the danger of other spinnable varieties of cotton being exported under the guise of Assam/Comilla.

The Indian Central Cotton Committee at its meeting in March, 1952, after careful consideration of the prevailing low price of Bengal Deshi recommended to the Government of India that the export duty on this variety of cotton be reduced forthwith by 50%, as, in its opinion, the high rate of the existing export duty was a big obstacle in the way of exports of this cotton to the limit of the quota allowed. The Government of India announced on the 16th March, 1952, the reduction in export duty from Rs. 400 to Rs. 200 per bale, with effect from that date.

(iii) Regulated Cotton Markets

In the past, the Cotton Committee had recommended to the State Governments that they should establish regulated markets for the orderly and remunerative marketing of cotton. Accordingly, legislation for the establishment of regulated markets was enacted in the States of Bombay, Madras, Punjab, Madhya Pradesh and Hyderabad. During the year under report, 81, 64, 6 and 69 regulated markets functioned satisfactorily in the States of Bombay, Punjab, Madras and Hyderabad respectively.

(iv) Agmarking

During the year, agmarking of cotton bales was continued at Hubli, Gadag, Bailhongal and Savanur in Bombay State. Affixing of 'Agmark' serves as a guarantee of purity of cotton. Agmark labels are affixed to bales of cotton, the ginning and pressing of which have been supervised by a special staff. The Committee is also giving financial help to co-operative societies and growers in the Surat area to market 1027 A.L.F. and Suyog

cottons under a guarantee of purity in accordance with the Agricultural Produce (Grading and Marking) Act, 1937.

(v) Cotton Baling Hoops

The arrangements for the distribution of cotton baling hoops were continued along the same lines as in the past year. During the year under report, 8,707 tons of hoops were distributed to pressing factories in the country by the Committee's office working in conjunction with the Iron and Steel Controller.

(vi) Other requirements of cotton ginning and pressing factories

The arrangements for the supply of coal to cotton ginning and pressing factories on the recommendation of the Committee's Secretary and the Textile Commissioner, Bombay, were continued during the season under report and about 140,690 tons of coal were recommended for supply.

In accordance with the recommendation of the Committee, which was accepted by the Government of India, it was decided that recommendations for the coal requirements of cotton ginning and pressing factories for the season in future be sent direct by this office to the Deputy Coal Commissioner (Distribution), Calcutta, and not through the Textile Commissioner, Bombay, as in the past. This decision has been implemented from July, 1952. In addition, assistance was given to the factories in the matter of obtaining iron and steel required for maintenance and repairs.

(vii) Dismantling of Cotton Ginning and Pressing Factories

As in the previous years, the Committee continued to deal with applications for the grant of permission for the dismantling of cotton ginning and pressing factories, referred to it by the Textile Commissioner, Bombay.

(viii) Legislation to maintain the purity of cotton and other protective measures

Several legislative measures have been passed by the Central and State Governments on the recommendation of the Indian Central Cotton Committee with a view to check the spread of undesirable or inferior types of cotton, insect pests and diseases and other malpractices in marketing. A

brief account of the working of these measures during the year under review is given below. For more details previous reports may be referred to.

(a) **Cotton Transport Act.**—During the year, 1951-52, the Government of Bombay amended the rules regarding various protected zones so as to include within them the areas which were added to the State consequent to the merger of the former Princely States within its borders. Further, in view of the successful cultivation of new varieties in certain areas, the Government of Bombay amalgamated (i) South Surat Area, Surat Area and Ankleshwar Area into one Protected Area, viz., Surat Area and (ii) Narmada-Mahi and Mahi-Sabarmati zones into one zones, viz., Narmada-Sabarmati zone.

(b) **Cotton Ginning and Pressing Factories Act.**—The Cotton Ginning and Pressing Factories Act, 1925, was made applicable to all Part B States from the 1st April, 1951. The question of amending the Act with a view to provide, *inter alia*, for the prevention of watering, mixing and adulteration of cotton is under consideration of the Part B and C States.

During the year under review, the Government of India published the Punjab Cotton (Prevention of Adulteration) Act, 1952, enacted by the President, to provide for the prevention of watering and adulteration of cotton.

(c) **Prevention of Introduction of Foreign Cotton Pests.**—In order to prevent the introduction of the Mexican Boll Weevil (*Anthonomus grandis*) into India along with imported American cotton, restrictions have been imposed by the Government of India whereby the import of this cotton is prohibited in the country except through the Port of Bombay. The law also requires that all such imported American cotton should be fumigated with hydrocyanic acid gas at the port of entry. From July, 1950, the import of American cotton has also been permitted through the Port of Madras, where arrangements for fumigation with hydrocyanic acid gas have been made by the Directorate of Plant Protection and Quarantine, Government of India. The work of fumigation at the Port of Bombay was carried out as in the past under the supervision of the Secretary, Indian Central Cotton Committee. The cost of fumigation was met by the levy of a small fee collected from the importers on each bale of American cotton fumigated. During the year under review, 682,700 bales of American cotton were fumigated at the Port of Bombay as compared with 219,419 bales in 1950-51.

The restrictions prohibiting the import of foreign *kapas* (unginned cotton) and cotton seed remained in force throughout the year.

(d) **Cotton Control Act.**—Cotton Control Acts continued to be in operation in the States of Madras, Bombay, Madhya Pradesh and Mysore. These very objects are served by the “East Punjab Improved Seeds and Seedlings Act,” and the “Cotton Cultivation and Transport Act” which are in force in the Punjab and Hyderabad States respectively.

The Madras Cotton Control Act, 1932, was passed with a view to eradicate the short staple, *Pulichai* cotton in certain areas of the State growing improved varieties. During the year, the question of repealing this Act and enacting a new one providing for regulation and prohibition of cultivation of any specified variety of cotton, the mixing of any specified variety with any other variety of cotton and the possession or use of, or trade in, any specified variety of cotton in certain areas of the Madras State was under the consideration of the State Government.

The Bombay Cotton Control Act empowers the State Government to prescribe the standard varieties that can be grown in particular areas and to prohibit the growing, possession or trading in other varieties in these areas. The act further provides penalties for the mixing of standard varieties of cotton with prohibited ones and of one standard cotton with another. During the year, the Government of Bombay was actively considering the question of extending the Act to Wagad tract prohibiting the cultivation of any cotton other than the improved variety, Kalyan, in certain areas of Ahmedabad and Mehsana districts.

The Madhya Pradesh Cotton Control Act prohibits the cultivation, possession or trade in the inferior short staple Garrow Hill Cotton.

The East Punjab Improved Seeds and Seedlings Act, 1949, the object of which is to ensure the compulsory cultivation in specified areas of prescribed improved varieties and the sowing of only such seed as is approved by the State Agricultural Department was extended during 1951-52 to 18 villages in Hissar, 12 villages in Rohtak, 25 villages in Ludhiana and 36 villages in Ferozepore districts.

During the year ending on the 31st August, 1952, the Mysore Cotton Control Act, 1942, was applied to 21 talukas of Mandya, Mysore, Hassan

and Chikmagalur districts and parts of Shimoga District of Mysore State whereby no cotton other than M.A.5 was permitted to be cultivated in those areas, as the pure seed for which was to be obtained from the departmental agency.

Under the Hyderabad Cotton Cultivation and Transport Act, the whole of Nanded district and Nirmal taluq of Adilabad district were declared as protected area for growing of Gaorani 6 variety. During the year under report, the question of constituting protected areas for Gaorani 12 and Parbhani-American 1 was under consideration. Suggestions were also made to the State Government for modifying the Act in certain respects with a view to bring it in line with the Cotton Control Act in the Bombay State.

The proposal for the enactment of legislation in Madhya Bharat on the lines of the Hyderabad Cotton Cultivation and Transport Act continued to receive the attention of the Madhya Bharat Government.

CHAPTER VII

GROW MORE COTTON CAMPAIGN

Special efforts to step up the production of cotton in the country initiated last year were continued during the year under report, 1951-52. The cotton supply position was only partially relieved as a result of increased production of 3.63 lakh bales in 1950-51, due to the 'Grow More Cotton' Campaign. As such, the Government of India in consultation with the State Governments decided to continue the campaign in 1951-52 and laid down plans for increasing production still further in the year.

All the special measures taken by the Government of India under the campaign for increasing cotton production in the country in 1950-51 were continued during 1951-52 also, with the exception of those relating to the remission of land revenue for the additional area brought under cotton cultivation. As a further incentive during the year under report, the Government of India raised the basic ceiling price of cotton over the prices notified for 1950-51 season by Rs. 50 per candy in the case of 'Jarila' and by Rs. 30 to Rs. 90 per candy in the case of other varieties.

In 1951-52, cotton extension schemes were put into operation in three more States, viz., Rajasthan, West Bengal and Orissa, thus raising the total number to 14. For the implementation of the various measures adopted under the schemes, the Government of India sanctioned an outright grant of Rs. 16.27 lakhs and an interest-free loan of Rs. 46.11 lakhs to the various State Governments.

The targets of additional area and production fixed for 1951-52 season over those in 1950-51 season, were 24.66 lakh acres and 7.56 lakh bales, thus raising the total production during 1951-52 season to about 40 lakh bales.

The split up of these, together with the achievements, under different heads is detailed below :—

Particulars	Additional Area		Additional Production	
	Targets	Expected achievements	Targets	Expected achievements
	(in lakhs of acres)		(in lakhs bales of 392 lbs. net)	
A. By expansion of area ..	24.66	21.86	5.93	4.22
B. By Intensive Cultivation—				
(i) By provision of irrigated facilities ..	0.43	0.63	0.15	0.22
(ii) By intercropping of other crops with cotton ..	5.22	1.48	0.52	0.13
(iii) By manuring ..	3.34	1.80	0.25	0.16
(iv) By use of improved seeds	31.33	25.05	0.56	0.44
(v) By control of insects and pests ..	0.41	0.18	0.03	0.01
(vi) By sowing of crop in lines..	0.82	0.72	0.06	0.15
(vii) By double cropping ..	0.14	0.03	0.06	0.01
Total ..			7.56	5.34

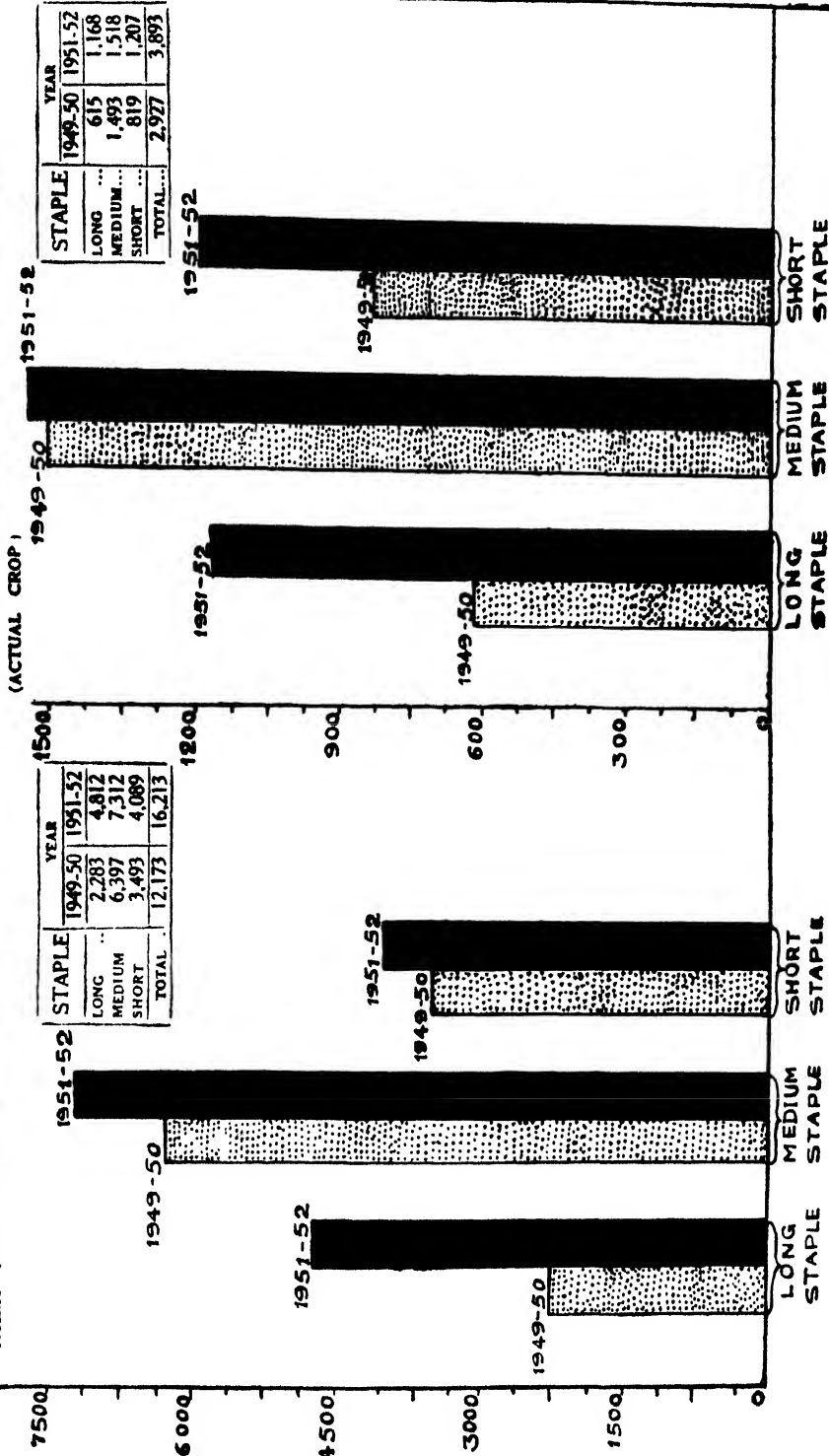
It will be seen that the total increase in the area and production of cotton stated to have been achieved under the schemes in the 1951-52 season was 21.86 lakh acres and 5.34 lakh bales, respectively, against the targets of 24.66 lakh acres and 7.56 lakh bales, thus raising the total production during 1951-52 season to about 38 lakh bales. The targeted increase in area and production was not achieved in full mainly due to unfavourable weather conditions which prevailed during the season in some parts of the country. In Madras, the out-break of the North-East Monsoon was delayed and the South-West Monsoon was weak. A famine of the worst type affected the Rayalaseema districts where even drinking water became scarce. Madhya Bharat, Bhopal, Rajasthan, Saurashtra, Bombay and Madras remained completely dry during the period from September to December, 1952. The crop suffered from root-rot in Hyderabad and from insect pests in certain districts of Bombay, Mysore and Madras States. The crop in Gujerat and Saurashtra was badly affected by a long spell of

INDIAN UNION

"GROW MORE COTTON" CAMPAIGN-1951-52--ACHIEVEMENTS

AREA (IN THOUSAND ACRES)

PRODUCTION (IN THOUSAND BALES OF 372 LBS. EACH)



drought, accounting for the loss of about 2 lakh bales of cotton. However, very favourable season in Madhya Pradesh, Khandesh and Hyderabad (Kharif-crop) made up this loss to a great extent.

The Planning Commission has in its five year plan, fixed a target of 42 lakh bales of cotton to be produced in the country by 1955-56. According to this plan, the target of production to be achieved in 1952-53 is 38 lakh bales. However, to be on the safer side the Indian Central Cotton Committee, at its meeting held in March, 1952, recommended that the target of cotton production in 1952-53 should be 39 lakh bales. The Committee felt that all further increase in production of cotton should be achieved mainly through land transformation and intensive cultivation, since any more diversion of food crop acreage to cotton would have a serious effect on the country's food supplies. It laid stress on (i) extension of the cultivation of improved varieties of cotton, (ii) provision of adequate plant protection measures to mitigate losses caused by insects and diseases, (iii) application of manure to all irrigated cottons, and (iv) extension of irrigation facilities to additional 3 million acres out of the 14 million acres that grow at present unirrigated cotton. Accordingly, the Government of India in consultation with the State Governments have already laid down plans for achieving target of 39 lakh bales in 1952-53.

P. D. GADKARI,
Deputy Secretary.

APPENDIX I

MEMBERS OF THE INDIAN CENTRAL COTTON COMMITTEE

(i) President, Sardar Datar Singh, Vice-President, Indian Council of Agricultural Research, *ex-officio*.

(ia) The Agricultural Commissioner with the Government of India, *ex-officio*.

(ii) Representatives of Agricultural Departments :—

Madras	...Shri M. S. Sivaraman.
Bombay	...Dr. B. N. Uppal.
Uttar Pradesh	...Dr. S. B. Singh.
Madhya Pradesh	...Dr. R. J. Kalamkar.
East Punjab	...Shri B. S. Sawhney.

(iii) The Director-General of Commercial Intelligence and Statistics, *ex-officio*.

(iv) Representatives of Chambers of Commerce and Associations :—

The East India Cotton Association	... Shri Madanmohan R. Ruia.
The Bombay Millowners' Association	... Shri Vithal N. Chandavarkar.
The Bombay Chamber of Commerce	... Mr. L. F. H. Goodwin.
The Indian Merchants' Chamber	... Shri Chimanlal B. Parikh.
The Ahmedabad Millowners' Association	... Shri Navnitlal Sakarlal Sodhan.
The Tuticorin Chamber of Commerce	... Mr. A. Mueller.
The Upper India Chamber of Commerce	... Shri J. K. Srivastava.
The Empire Cotton Growing Corporation	... Mr. C. P. Bramble.

(v) Representatives of the cotton manufacturing or cotton ginning industry :—

Madhya Pradesh	{ Shri R. V. Deshmukh.
	{ Shri Kisanlal Goenka.
Madras	...Shri C. M. Kothari.
East Punjab.	...Shri Kundan Lal,

(vi) West Bengal Representative ... Dr. N. Dutt.

(vii) Co-operative Banking Representative ... Shri R. G. Saraiya.

(viii) Representatives of Cotton Growing Industry :—

Madras	{ Shri C. G. Guruswami Naidu.
	{ Shri M. Lakshmikantha Reddy.
Bombay	{ Shri F. B. Loxmeshwar.
	{ Shri S. R. Rane.
Uttar Pradesh	{ Major Nawab Mohd. Jamshed
	{ Ali Khan.
Madhya Pradesh	{ Lala Basant Lal Agarwala.
	{ Shri S. K. Wankhede.
	{ Shri P. S. Patil.
East Punjab.	... Sardar Waryam Singh.

(ix) Representatives of Part 'B' States :—

Mysore	... Vacant, <i>vice</i> Dr. L. S. Doraiswamy.
Madhya Bharat	... Shri P. S. Bapna.
United States of Rajasthan	... Dr. S. V. Desai.
Patiala and East Punjab States Union	... Dr. Arjan Singh.
United States of Kathiawar (Saurashtra)	... Dr. J. C. Ramchandani.
Hyderabad	... Shri P. D. Nair.

(x) Additional Members nominated by the Central Government under Section 4(x) of the Indian Cotton Cess Act :—

Shri Chunilal B. Mehta	Dr. V. K. R. V. Rao.
Shri Bhawanji A. Khimji	Mr. Neville Wadia.
Mr. D. N. Mahta	Pandit Thakurdas Bhargava.
Shri S. Bhoothalingam	Seth Issardas Varindmal.
Shri Brijlal Nandlal Biyani	Sardar Ujjal Singh.
Shri S. S. Pande.	Shri C. Jagannatha Rao.

APPENDIX II

SUB-COMMITTEES

Standing Finance Sub-Committee.—Shri Chimanlal B. Parikh (Vice-President), Chairman; Sardar Datar Singh (President) (*ex-officio*); Shri R. G. Saraiya; Shri Chunilal B. Mehta; Shri Vithal N. Chandavarkar; Mr. D. N. Mahta; Mr. L. F. H. Goodwin; Shri S. K. Wankhede; and Shri Madanmohan R. Ruia.

Local Sub-Committee.—President (Sardar Datar Singh); the Vice-President (Shri Chimanlal B. Parikh); Shri R. G. Saraiya; Shri Chunilal B. Mehta; Shri Vithal N. Chandavarkar; Mr. D. N. Mahta; Mr. L. F. H. Goodwin; Shri Madanmohan R. Ruia; Shri F. B. Loxmeshwar; Dr. B. N. Uppal; Mr. A. Mueller and Shri Bhawanji A. Khimji.

AGRICULTURAL RESEARCH SUB-COMMITTEE

- I. **The President.**—Sardar Datar Singh (*ex-officio*).
- II. **The Vice-President.**—Shri Chimanlal B. Parikh (*ex-officio*).
- III. **Co-operative Banking Representative.**—Shri R. G. Saraiya.
- IV. **Cotton Growers' Representatives.**—Sardar Ujjal Singh, Pandit Thakurdas Bhargava, Shri S. K. Wankhede, Shri P. S. Patil, Shri F. B. Loxmeshwar and Shri S. R. Rane.
- V. **Cotton Trade Representatives.**—Shri Madanmohan R. Ruia, Shri Chunilal B. Mehta, Mr. A. Mueller, Mr. L. F. H. Goodwin and Shri Kisanlal Goenka.
- VI. **Agricultural Officers.**—The Agricultural Commissioner with the Government of India (*ex-officio*), Mr. D. N. Mahta; Shri M. S. Sivaraman; Dr. B. N. Uppal; Dr. S. B. Singh; Dr. R. J. Kalamkar; Shri P. S. Bapna; Dr. Arjan Singh; Shri B. S. Sawhney; Dr. S. V. Desai; Shri P. D. Nair; Dr. J. C. Ramchandani and Shri C. Jagannatha Rao.
- VII. **Additional Members.**—Shri R. Balasubramania Ayyar; Dr. R. Sankaran; Shri S. S. Pande; Shri G. B. Patel; Dr. V. G. Panse; Dr. S. M. Sikka; Dr. C. Nanjundayya; Shri V. K. Bederkar; Shri B. M. Dabral; Dr. N. R. Bhat; The Economic Botanist, Assam; The Economic Botanist, Bihar and the Cotton Development Officer, Orissa.

VIII. The Secretary, Indian Central Cotton Committee (*ex-officio*).

TECHNOLOGICAL RESEARCH SUB-COMMITTEE

The President, Sardar Datar Singh, (*ex-officio*); The Vice-President, Shri Chimanlal B. Parikh, (*ex-officio*); The Agricultural Commissioner with the Government of India, (*ex-officio*); Shri R. G. Saraiya; Shri Chunilal B. Mehta; Mr. A. Mueller; Shri Vithal N. Chandavarkar; Shri Madanmohan R. Ruia; Mr. Neville Wadia; Shri Bharat Ram; Shri J. K. Srivastava; Mr. L. F. H. Goodwin; Mr. D. N. Mahta; Dr. B. N. Uppal; Dr. R. J. Kalamkar, Shri M. S. Sivaraman; Shri B. S. Sawhney; Shri P. D. Nair; Shri S. S. Pande; Shri G. B. Patel; Dr. R. Sankaran; Shri V. K. Bederkar; Shri C. Jagannatha Rao; Dr. N. R. Bhatt; Shri B. M. Dabral; Shri P. S. Patil; Shri R. V. Deshmukh; Shri Kisanlal Goenka; Dr. C. Nanjundayya; The Director of Industries, Bombay; The Principal, Victoria Jubilee Technical Institute; Dr. G. M. Nabar; Dr. V. G. Panse; Shri Pratap Bhogilal; Shri B. D. Kulkarni; Shri Rasiklal C. Nagri; Shri Chinubhai Naranbhai; Shri J. P. Patel; Shri Jamnadas Ramdas; and Dr. L. Thoria.

COTTON FORECAST SUB-COMMITTEE

The President, Sardar Datar Singh, (*ex-officio*); The Vice-President, Shri Chimanlal B. Parikh, (*ex-officio*); The Agricultural Commissioner with the Government of India, (*ex-officio*); Shri R. G. Saraiya; The Director of Commercial Intelligence and Statistics; Dr. V. K. R. V. Rao; The Director of Agriculture, Bombay State; The Director of Agriculture, Madras State; The Director of Agriculture, Madhya Pradesh; The Director of Agriculture, Punjab; Shri Chunilal B. Mehta; The Director of Land Records, Madhya Pradesh; Mr. D. N. Mahta; Mr. A. Mueller; Dr. V. G. Panse; The Director of Statistics, Hyderabad-Dn; The Economic and Statistical Adviser to the Government of India, Ministry of Food and Agriculture; The Economic Adviser and Joint Secretary to the Government of Madras Public, (Economics and Statistics), Department, Madras.

COTTON GINNING AND PRESSING FACTORIES SUB-COMMITTEE

The President :— (Sardar Datar Singh); The Vice-President: (Shri Chimanlal B. Parikh), (*ex-officio*); Shri Chunilal B. Mehta; Shri R. G. Saraiya; Shri Madanmohan R. Ruia; Shri Vithal N. Chandavarkar; Mr. A.

Mueller; Mr. L. F. H. Goodwin; Shri C. M. Kothari; Shri Kundanlal; Dr. B. N. Uppal; Shri J. K. Srivastava; Shri R. V. Deshmukh; Shri Bhawanji A. Khimji; Dr. C. Nanjundayya and Shri S. S. Pande.

EXPERT SUB-COMMITTEE TO FILL TECHNICAL POSTS UNDER THE INDIAN CENTRAL COTTON COMMITTEE

The President, The Vice-President, The Director of Agriculture, Bombay State, and the Secretary.

RESEARCH STUDENTS SELECTION SUB-COMMITTEE

The President (*ex-officio*); The Vice-President (*ex-officio*); The Agricultural Commissioner with the Government of India; Dr. C. Nanjundayya, Director, Technological Laboratory; and the Secretary (*ex-officio*).

APPENDIX III

Statement of Receipts and Payments for the year ended 31st March, 1952

RECEIPTS	Rs.	a. p.		EXPENDITURE	
				Rs.	a. p.
Opening Balance as on 1st April, 1951.	56,10,909	5 6	<i>Administration of the Committee :—</i>		
Receipts under Section 12 of the Indian Cotton Cess Act, 1923	8,25,521	5 9	(Including Improvement of cotton Marketing, Printing, Publicity and Distribution and Travelling allowance of non-official members)	3,02,306	9 4
Other Receipts	..	1,99,188 2 7	<i>Agricultural Research Grants-in-Aid :—</i>		
Amount received from the Cotton Fund disposal of the Government of India...	1,37,739	0 0	(Including Research. Seed, Marketing and Miscellaneous schemes)	8,90,366	8 8
			<i>Technological Research</i>	3,39,834	8 3
			<i>Closing Balance :—</i>		
			Government Securities and Corporation Bonds	53,02,563	6 0
			Imprests	5,350	0 0
			Suspense (Recoverable)	65,181	13 7
				53,73,095	3 7
			<i>Less—Over draft Account with the Imperial Bank of India, Bombay. (Against Hypothecation of 3 per cent. Government of Indian Loan, 1966-68 of the face value of Rs. 1,50,000)</i>	1,32,245	0 0
			<i>*Total Closing Balance ..</i>	52,40,850	3 7
Total ..	67,73,357	13 10	Total ..	67,73,357	13 10

* Includes Rs. 35,824-4-0 on account of Sinking Fund.

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